

Contents—June 1939

Volume XX

No. 6

ARCHIVES OF PHYSICAL THERAPY

DISRAELI KOBAK, M.D., Editor

Suite 712 — 30 North Michigan Avenue, Chicago, Illinois

Original contributions, exchanges and books for review should be forwarded to the Editorial Office. All business matters including advertising should be handled through the Executive Office, Suite 712 — 30 N. Michigan Ave., Chicago, Illinois. The statements in the manuscripts published in the ARCHIVES OF PHYSICAL THERAPY, are made solely on the responsibility of the author. The American Congress of Physical Therapy does not assume any responsibility for statements contained therein. Manuscripts accepted for publication in ARCHIVES OF PHYSICAL THERAPY, are for exclusive publication and may not be published elsewhere.

OFFICERS

American Congress of Physical Therapy

FRANK H. KRUSEN, M.D.,
Rochester, Minn., President.
WILLIAM H. SCHMIDT, M.D.,
Philadelphia, President-Elect.
NATHAN H. POLMER, M.D.,
New Orleans, First Vice-President.
FRED B. MOOR, M.D.,
Los Angeles, Second Vice-President.
KRISTIAN G. HANSSON, M.D.,
New York, Third Vice-President.
MILAND E. KNAPP, M.D.,
Minneapolis, Fourth Vice-President.
WALTER S. MCCLELLAN, M.D.,
Saratoga Springs, N. Y.,
Fifth Vice-President.
RICHARD KOVACS, M.D.,
New York, Secretary.
JOHN STANLEY COULTER, M.D.,
Chicago, Treasurer.
MARION G. SMITH, B.S.,
Chicago, Executive Secretary.
A. R. HOLLENDER, M.D.,
Chicago, Executive Director.

EXECUTIVE COUNCIL

Frederick L. Wahrer, M.D., Marshalltown,
Iowa, Chairman.
Norman E. Titus, M.D., New York, Secretary.
William Bierman, M.D., New York.
John Stanley Coulter, M.D., Chicago.
James C. Elsom, M.D., Madison, Wisconsin.
Frank H. Ewerhardt, M.D., St. Louis.
Roy W. Fouts, M.D., Omaha.
John Severy Hibben, M.D., Pasadena.
Disraeli Kobak, M.D., Chicago.
Gustav Kolischer, M.D., Chicago.
Albert Frank Tyler, M.D., Omaha.
Frank H. Walke, M.D., Shreveport, La.
Frank H. Krusen, M.D., Rochester, Minn.,
Ex-Officio.

PUBLICATION COMMITTEE

DISRAELI KOBAK, M.D.
A. R. HOLLENDER, M.D.
ALBERT F. TYLER, M.D.
M. C. L. MCGUINNESS, M.D.
RICHARD KOVACS, M.D.
WM. H. SCHMIDT, M.D.
FRANK H. KRUSEN, M.D.

Subscriptions — In the United States, its possessions, and Mexico, \$5.00 yearly; Canada, \$5.50; elsewhere, \$6.50 the year.

Advertising rates on application. All advertising copy subject to acceptance by publication committee.

Published monthly at Chicago, Illinois, by American Congress of Physical Therapy. Entered as Second Class Matter January 29, 1938, at the Post Office at Chicago, Illinois, under the Act of March 3, 1879.

ORIGINAL ARTICLES

- Chronic Recurring Sciatica: Diagnosis and Treatment of Protrusions of Ruptured Intervertebral Disks Alfred W. Adson, M.D. 325
- Short Wave Diathermy in Pyogenic Infections About the Head and Neck William J. Egan, M.D. 331
- Rationale of Short Wave Diathermy in Acute Sinusitis Farel Jouard, M.D. 338
Discussed by Drs. Frederick L. Wahrer, Norman E. Titus, O. E. Van Alyea, Meyer Gorin, J. I. Thorne, N. S. Burnap, William J. Egan and Farel Jouard.
- Status of Transurethral Prostatic Resection Hu C. Myers, M.D. 342
- Clinical Results of Fever Therapy Earl C. Elkins, M.D., and Frank H. Krusen, M.D. 346
- Infra-Red Photography in the Diagnosis of Vascular Tumors F. Ronchese, M.D. 354
- Gastro-Intestinal Therapy in Atrophic Arthritis E. Goldfain, M.D. 357
Discussed by Dr. Eugene F. Traut.
- The Psychologic Importance of Play in a Children's Hospital Anne M. Smith, O. T. 361

EDITORIALS

- Regimentation of Short Wave Diathermy 365
- Southeastern Section Meeting to Be Held July 10 at George Washington Hotel, Jacksonville, Florida 367

SPECIAL SECTION

- Science, News, Comments 369

THE STUDENT'S LIBRARY

- Book Reviews 373

INTERNATIONAL ABSTRACTS

- Abstracts from Physical Therapy, X-Ray, Radium and Biophysics 377

*The Ultraviolet Lamp
Doctors have been waiting for*



When at the New York
World's Fair Visit the
HANOVIA EXHIBIT in
the Hall of Metals.

The New
**HANOVIA
LUXOR "S"**

**Another Important Scientific
Advance by Hanovia**

More effective . . . more economical to operate . . . simplified control . . . a definite time saver . . . a high quality ultraviolet lamp of superior construction at a low price. The Luxor "S" is guaranteed to render longer and more satisfactory service.

Here are the features which distinguish the new Hanovia Luxor "S" Ultraviolet Alpine Lamp:

1. Starts instantly at the snap of a switch, no more tilting necessary.
2. Builds up rapidly to full intensity—cools quickly ready for relighting.
3. These fast moving operations save time and energy—important factors in a doctor's office.
4. Provides intense radiation and an even distribution over a wide shadowless surface.
5. Shorter treatment time.
6. Counterbalanced Shifting Cross Arm—permitting adjustment to every desired position.
7. Lower in original cost and economical to operate.
8. Longer useful burner life—another factor in economy.
9. Simplicity of operation.
10. Improved manipulative convenience.
11. Beautiful and sturdy design.

It is the most complete lamp ever offered at so low a purchase price. You can have this lamp placed in your office immediately by our small monthly budget payment plan. The purchaser of this lamp receives our usual guarantee backed by a company whose supremacy in the field of light therapy is world wide.

For full particulars write to

HANOVIA CHEMICAL & MFG. CO.
Dept. 306-F Newark, N. J.



CHRONIC RECURRING SCIATICA:

Diagnosis and Treatment of Protrusions of Ruptured Intervertebral Disks *

ALFRED W. ADSON, M.D.

Section on Neurologic Surgery, The Mayo Clinic

ROCHESTER, MINNESOTA

The commonest cause of chronic, recurring sciatica is protrusion or rupture of an intervertebral disk, with prolapse of the nucleus pulposus into the spinal canal. Although compression of spinal roots by protrusion of an intervertebral disk is a common cause of chronic recurring sciatica, many other lesions in the lumbosacral region are capable of producing painful sensation in the region of distribution of the sciatic nerve.^{9, 15} Among these lesions are injuries to the osseous, muscular, ligamentous and nervous structures. Intra-spinal tumors, tumors of the spinal column itself, tumors within the pelvis, sacro-iliac disease, hypertrophic arthritis, radiculitis and neuritis are similar causes responsible for pain in the distribution of the sciatic nerve.

The recent prominence that protruded intervertebral disks have attained is owing to the fact that roentgenographic observations, after intraspinal injection of air or of a radiopaque oil such as lipiodol, have made possible definite preoperative diagnosis of the lesion. The results obtained from laminectomy, with removal of the protruded intervertebral disk and freeing of the compressed nerve often have been so pronounced, in comparison to the temporary relief obtained from general measures such as rest in bed, local application of heat and traction, that I do not hesitate to advise spinal puncture and studies with radiopaque oil if there is a good reason that the patient has a protruded intervertebral disk. The presence of recurring, chronic sciatica, with or without a definite history of trauma, exaggerated flexion or torsion of the spine, with Kernig and Lasègue signs and diminished Achilles reflexes, invariably warrants the suspicion that an injury has been sustained by an intervertebral disk in the lower lumbar region.

It is not within the scope of this paper to discuss the details of physical therapeutic measures. However, I do wish to emphasize the fact that surgical procedure should not be employed until physical measures have been given a trial, and it is only when these fail and when the attacks of sciatica recur that it becomes necessary to consider laminectomy. In all instances where there is a history of trauma, the patient is seen jointly by a neurologist, an orthopedic and a neurologic surgeon. Physical therapy instituted following the incidence of trauma is directed and supervised by Doctor Krusen, an associate in the Department of Physical Therapy. In most instances temporary relief will be obtained, but when recurrences appear, a protruded intervertebral disk should be suspected and further investigation with radiopaque oil or pneumo-spinography becomes necessary.

Anatomy

Before discussing the symptoms and differential diagnosis of protruded or ruptured intervertebral disks, with prolapse of the nucleus pulposus, it is worth while to review the anatomy of the intervertebral disks and the mechanics involved in their protrusion or rupture.

Each fibrocartilaginous disk is of lenticular form and of composite structure. The disks are interposed between the adjacent surfaces of the bodies

* Read at the Seventeenth Annual Session of the American Congress of Physical Therapy, Chicago, September 12, 1938.

of the vertebrae, from the axis to the sacrum, and form the chief bonds of connection between those bones. These disks vary in shape, size and thickness in different parts of the vertebral column. In shape they accurately correspond with the surfaces of the bodies between which they are placed; they are oval in the cervical and lumbar regions and circular in the thoracic region. Their size is greatest in the lumbar region. Their thickness varies, not only in the different regions of the vertebral column but also in different parts of the same disk; thus, they are thicker in front than behind in the cervical and lumbar regions, and uniformly thick in the thoracic region. The intervertebral disks form about a fourth of the vertebral column, exclusive of the first two vertebrae; they are not equally distributed, however, between the various bones; the thoracic portion of the vertebral column has, in proportion to its length, a much smaller quantity than the cervical and lumbar regions, which necessarily gives to the latter portion greater pliancy and freedom of movement. The intervertebral disks are adherent, by their surfaces, to a thin layer of hyaline cartilage which covers the upper and under surfaces of the bodies of the vertebrae, and in which, in early life, the epiphyseal plates develop. By their circumferences these disks are closely connected in front to the anterior, and behind to the posterior, common ligament. In the thoracic region the disks are connected laterally by the inter-articular ligament, to the heads of those ribs which articulate with two vertebrae; the disks, consequently, form part of the articular cavities in which the heads of these bones are received.

The outer portion of the intervertebral substance is composed of many layers of fibrous connective tissue. This enveloping portion is called the "annulus fibrosus." The structure of the central portion of the disk is of soft, pulpy, highly elastic fibrocartilage, containing some bands of connective tissue. It is called the "nucleus pulposus," is yellowish, and rises considerably above the surrounding level when the disk is divided horizontally. This pulpy substance, which is especially well developed in the lumbar region, is the remains of the notochord, and, according to Luschka, contains a small synovial cavity in its center. The outer layers of the disk are arranged concentrically, one within the other, the outermost consisting of ordinary fibrous tissue, but the others, which are more numerous, of white fibrocartilage. These plates are not quite vertical in their direction; those near the circumference are curved outward and are closely approximated, while those nearest the center curve in the opposite direction and are somewhat more widely separated. The fibers of which each plate is composed are directed, for the most part, obliquely from above downward, those of adjacent plates passing in opposite directions and varying in every layer. Therefore, the fibers of one layer are directly across those of another, like the limbs of the letter "x." This laminar arrangement belongs to about the outer half of each disk. The pulpy substance does not present a concentric arrangement and consists of a fine, fibrous matrix containing angular cells, united to form a reticular structure.

The bodies and intervertebral cartilages are further supported by the anterior and posterior common ligaments, with the addition of the ligamenta flava and of the interspinous, supraspinous and lumbosacral ligaments.

Injuries to Intervertebral Disks and Associated Structures

In a few instances the hypertrophy of a ruptured ligamentum flavum appears to have contributed to compression of the lumbar spinal nerve, without the presence of a protruded disk, but as a rule with rupture of the ligamentum flavum. The compensatory hypertrophy at the situation of the tear rarely is responsible for true chronic recurring sciatica. An hyper-

trophied ligamentum flavum often is associated with a protruded intervertebral disk. This undoubtedly is explained on the basis that the trauma, which was sufficient to produce injury to the intervertebral disk, likewise was sufficient to tear the ligamentum flavum, and the hypertrophy is the result of a reconstructive process. In these instances the spinal root often is displaced dorsally by protrusion of the disk from in front against the hypertrophied ligamentum flavum and the peduncle of the vertebra.²¹

Most of the injuries to an intervertebral disk take place in the flexible portion of the spinal column, above a part that is not flexible. This is true since the greatest number of injuries occur between the fourth and fifth lumbar, fifth lumbar and first sacral vertebrae, and in the lower cervical region. Protrusions of the intervertebral disks into the spinal canal vary in degree from a small protrusion, to rupture of the disk, with prolapse of the nucleus pulposus into the spinal canal. The protrusions without rupture result from stretching or tearing of a few fibers in the annulus fibrosus. Repeated injuries, acute flexion of the movable portion of the spinal column on a fixed portion are capable of tearing a sufficient number of fibers in the annulus fibrosus to allow prolapse of the nucleus pulposus through the injured portion of the annulus. When this occurs, the nucleus may either partially or completely prolapse into the spinal canal. The small protrusions which mildly compress the nerve roots against the peduncle frequently disappear when the spinal column is extended or when the direction of the axis of the spinal column is changed. This phenomenon explains why temporary relief is obtained by rest in bed and traction, and also explains why a protruded disk sometimes is not found at operation. Patients who have lesions of this sort also are those who obtain relief from bony fixation. The larger protrusions and prolapse of the nucleus pulposus produce more or less constant pressure on the lumbar spinal nerves and likewise produce persistent sciatic pain, with a listing of the thorax away from the painful side. The experiences of Drs. Love and Craig and myself have revealed that protrusions occur, more frequently than elsewhere, along the dorsolateral aspects of the intervertebral disks, just lateral to the posterior common ligament of the spinal column. The lesions usually are single but have also occurred between several vertebrae. They likewise have taken place in the midline, although rarely. Moreover, they have occurred on both sides of the posterior longitudinal ligament. I presume they have occurred on the anterior surfaces of the vertebrae but, if they have, their incidence has not been reported by pathologists.

With co-workers in The Mayo Clinic,^{2,5,7,10} as early as 1922, I performed laminectomy and removed a protruded disk which had been pressing on the cervical portion of the spinal cord, with consequent production of neurologic symptoms in all four extremities. The patient is still alive fifteen years after the operation and is earning his living as a barber. A report of this case,¹ incidentally, was presented in a paper on tumors of the spinal cord, before the Seattle Surgical Society on January 8, 1925, which included a drawing of the operative exposure of the disk.

In 1928 Stookey²¹ reported seven cases of compression of the cervical portion of the spinal cord resulting from protrusion of cervical intervertebral disks. In 1929 Dandy⁸ reported two cases in which he had operated for protrusion of a lumbar intervertebral disk with paraplegia. He stressed the importance of trauma in the production of these lesions and the benefits to be derived from laminectomy and removal of the protruded fragments of disks. Bucy,⁶ in 1930, reported a case of a tumor of one of the lumbar disks. This protrusion was removed and Bucy felt that the tissue represented a

true neoplasm. Hawk,¹⁰ in 1936, added ten cases to the literature and analyzed fifty from previous reports.

Neurosurgeons at The Mayo Clinic for many years have removed during laminectomy extradural fibrocartilaginous masses from the spinal canal in cases diagnosed as tumor of the spinal cord. It has been only in recent years that we have come to look on these masses not as neoplasms, but as abnormal protrusions of a normal unit of the spinal column. In 1924 such a specimen, submitted to a surgical pathologist, was reported by him to give evidence of "fibrochondromatosis of the intervertebral disk." Formerly patients who had this condition had been operated on so infrequently and so late in the course of the process (in contrast to today) that at the time of operation the clinical picture was that of compression of the spinal cord, such as is caused by a neoplasm. These cases were then usually classified as extradural tumor of the spinal cord. The work of Mixter and Barr,¹⁷ in 1934, served to focus attention on these cases and since then the condition has been recognized earlier and operation has been performed before the classic symptoms and signs of a neoplasm affecting the spinal cord have developed. The paper by Mixter and Ayer,¹⁶ in 1935, again served to emphasize the frequency of occurrence of protrusion of disks with the production of root pain.²⁰

Naffziger¹⁸ and his co-workers recently reviewed the lesions of the intervertebral disks and the ligamenta flava, calling special attention to the anatomic factors involved in rupture of the intervertebral disks and to prolapse of the nucleus pulposus.

The chief symptoms in cases of protrusion of intervertebral disks are root pain. Since the protrusion most often occurs in the lumbar region, the chief complaint is of pain low in the back and of sciatic pain, usually unilateral. The findings on examination frequently are scanty, but usually Lasègue's sign (raising the straight leg) is positive and often the Achilles tendon reflex on the involved side is diminished or absent. Ordinarily roentgenograms are of little value in diagnosis, although narrowing of the space between the fourth and fifth lumbar vertebrae, or between the fifth lumbar and first sacral vertebrae is suggestive of the presence of protrusion of a disk at that level.

The concentration of total protein in the cerebrospinal fluid obtained by lumbar puncture usually is in excess of 40 mg. per 100 cc.; in approximately a fourth of my cases the value has been less than 40 mg. Spinal subarachnoid block is a rare finding and when it is present the lesion usually has produced such marked compression of the spinal cord or of the cauda equina, and such marked neurologic findings have resulted from this blocking of the spinal canal by the large fragment of cartilage, that a diagnosis of tumor of the spinal cord is made. Because of the cases in which values for total protein in the cerebrospinal fluid are normal or low, we employ a reversed Queckenstedt test which is helpful in the diagnosis of lumbar protrusions. This test is based on essentially the same principles as the usual Queckenstedt test, except that the increase in intraspinal pressure in the caudal sac is produced by the extradural injection of a 1 per cent solution of procaine hydrochloride, while in the regular test the pressure comes from within, when the return vascular circulation (internal jugular veins) is obstructed. One of the most important results of this test is the patient's reaction to compression of the cauda equina by the extradural solution. In case of a lesion involving one or more caudal roots, compression of the sac produces excruciating pain in the distribution of the involved root.

The clinical diagnosis of protruded disk as the cause of "sciatica"¹³ is based on a history of trauma to the back with persistent or recurrent pain low in the back and sciatic pain, diminished or absent Achilles tendon reflex

and an increased concentration of total protein in the cerebrospinal fluid. If the value for total protein is normal or low, the reversed Queckenstedt test should be positive before an attempt is made to confirm the diagnosis. The diagnosis is established and the protruded disk is identified by roentgenoscopy of the spinal canal, after subarachnoid injection of radiopaque oil through a lumbar puncture needle.¹¹⁻¹³

Radiopaque oil (lipiodol), 5 cc., is injected into the subarachnoid space between the spinous processes of the third and fourth lumbar vertebrae. Care should be exercised to avoid extradural injection. Rarely is cisternal injection justified. During roentgenoscopic observation of the spinal canal search should be made for other lesions, such as neoplasm and multiple protrusions of the intervertebral disks. If on roentgenoscopy of the movements of the opaque oil in the canal a persistent defect characteristic of protruded disk is noted (fig. 1), and if a lesion at that level could account for the patient's pain, an exploratory operation is indicated.



Fig. 1.—Showing protrusion of an intervertebral disk into the spinal canal (lipiodol).

The operative procedure consists of a unilateral laminectomy and removal, either extradural (fig. 2) or transdural, of the protruded portion of the disk. A partial resection of the spines and laminae of two vertebrae provides adequate exposure for removal of a single protruded disk; in case of multiple protrusions between adjacent vertebrae three spines and laminae must be removed. In one case of multiple protrusions, Love²² performed double laminectomy because one protrusion was at the lumbosacral space and the other was low in the thoracic region. Resection of the ligamenta flava is performed prior to removal

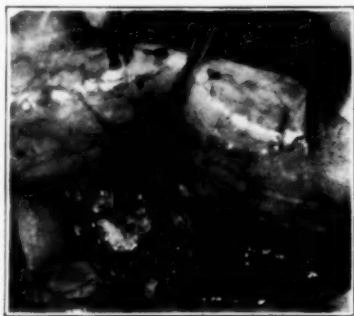


Fig. 2.—Protruded disk in situ. The fourth lumbar root and dura has been retracted in order to expose the protruded conical mass.

of the protruded portions of the disks. If the lesion presents in the median line, it is best to approach it transdurally, in which case wide laminectomy is not necessary. The radiopaque oil is carefully removed at the time of operation.

Fixation of the spinal column by bone graft, cast, or even by a belt, is rarely necessary after removal of a protruded disk. The patients are treated postoperatively as if they had undergone simple laminectomy for tumor of

the spinal cord. They are kept in bed for fourteen days, are allowed to leave the hospital on the sixteenth day and to return to their homes three weeks following operation. They are advised to refrain from heavy lifting and straining for a period of three months.¹⁴

Bibliography

1. Adson, A. W.: Diagnosis and Treatment of Tumors of the Spinal Cord. *Northwest Med.* **24**:309-317 (July) 1925; *Arch. franco-belges de chir.* **28**:125-139 (July) 1925.
2. ———: Diagnosis and Treatment of Tumors of the Spinal Cord. *Northwest Med.* **24**:309-317 (July) 1925.
3. ———, and Ghormley, R. K.: Fixation of the Spine for Dislocation Following Removal of a High-lying Tumor of the Cervical Portion of the Spinal Cord. *Proc. Staff Meet., Mayo Clin.* **8**:297-300 (May 17) 1933.
4. ———, and Little, George: Upright Cerebellar Frame. *Proc. Staff Meet., Mayo Clin.* **9**:481-484 (Aug. 8) 1934.
5. ———, and Ott, W. O.: Results of the Removal of Tumors of the Spinal Cord. *Arch. Neurol. & Psychiat.* **8**:520-537 (Nov.) 1922.
6. Bucy, P. C.: Chondroma of Intervertebral Disk. *J.A.M.A.* **94**:1552-1554 (May 17) 1930.
7. Camp, J. D.; Adson, A. W., and Shugrue, J. J.: Roentgenographic Findings Associated with Tumors of the Spinal Column, Spinal Cord, and Associated Tissues. *Am. J. Cancer*, **17**:348-372 (Feb.) 1933.
8. Dandy, W. E.: Loose Cartilage from Intervertebral Disk Simulating Tumor of the Spinal Cord. *Arch. Surg.* **19**:660-672 (Oct.) 1929.
9. Goldthwait, J. E.: The Lumbo-sacral Articulation. An Explanation of Many Cases of "Lumbago," "Sciatica" and Paraplegia. *Boston M. & S. J.* **164**:365-372 (Mar. 16) 1911.
10. Hawk, W. A.: Spinal Compression Caused by Echondrosis of the Intervertebral Fibrocartilage: With a Review of the Recent Literature. *Brain*, **59**:204-224 (June) 1936.
11. Love, J. G.: Protrusion of the Intervertebral Disk (Fibrocartilage) Into the Spinal Canal. *Proc. Staff Meet., Mayo Clin.* **11**:529-535 (Aug. 19) 1936.
12. ———: Intractable Low Back and Sciatic Pain Due to Protruded Intervertebral Disks: Diagnosis and Treatment. *Minn. Med.* **21**:832-839 (Dec.) 1938.
13. ———, and Camp, J. D.: Root Pain Resulting from Intraspinal Protrusion of Intervertebral Disks: Diagnosis and Surgical Treatment. *J. Bone & Joint Surg.* **19**:776-804 (July) 1937.
14. ———; Adson, A. W., and Craig, W. McK.: Chronic Recurring Sciatic Pain Due to Protruded Intervertebral Disks. *Journal-Lancet, n.s.* **58**:479-481 (Nov.) 1938.
15. Middleton, G. S., and Teacher, J. H.: Injury of the Spinal Cord Due to Rupture of an Intervertebral Disc During Muscular Effort. *Glasgow M. J.* **76**:1-6, 1911.
16. Mixer, W. J., and Ayer, J. B.: Herniation or Rupture of the Intervertebral Disc Into the Spinal Canal: Report of Thirty-four Cases. *New England J. Med.* **213**:385-393 (Aug. 29) 1935.
17. Mixer, W. J., and Barr, J. S.: Rupture of the Intervertebral Disc with Involvement of the Spinal Canal. *New England J. Med.* **211**:210-215 (Aug. 2) 1934.
18. Naffziger, H. C.; Inman, Verne, and Saunders, J. B. de C. M.: Lesions of the Intervertebral Disc and Ligamenta Flava; Clinical and Anatomical Studies. *Surg., Gynec. & Obst.* **66**:288-299 (Feb. 15) 1938.
19. Parker, H. L., and Adson, A. W.: Compression of the Spinal Cord and Its Roots by Hypertrophic Osteo-arthritis: Diagnosis and Treatment. *Surg., Gynec. & Obst.* **41**:1-14 (July) 1925.
20. Schmorl, Georg, and Junghanns, Herbert: Die gesunde und kranke Wirbelsäule im Röntgenbild: Pathologisch-anatomische Untersuchungen. *Fortschr. a. d. Geb. d. Röntgenstrahlen. Ergänzungsband* **43**:1-211, 1932.
21. Stookey, Byron: Compression of the Spinal Cord Due to Ventral Extradural Cervical Chondromas. Diagnosis and Surgical Treatment. *Arch. Neurol. & Psychiat.* **20**:275-291 (Aug.) 1928.
22. Walsh, M. N., and Love, J. G.: Protruded Intervertebral Disk as a Cause of Intractable Pain. *Proc. Staff Meet., Mayo Clin.* **13**:203-205 (Mar. 30) 1938.

SHORT WAVE DIATHERMY IN PYOGENIC INFECTIONS ABOUT THE HEAD AND NECK *

WILLIAM J. EGAN, M.D.

MILWAUKEE

At a previous session of the Congress¹ I reported my experience with ultra-short wave diathermy in pyogenic infections. At that time attention was called to Totten's² paper stressing the potential danger of infections of the face because of the anatomic arrangement of the facial veins. In various reports the mortality due to facial furuncles has been listed as 5.5 — 31 per cent.

Uncontrolled infection of the face may reach the cavernous sinuses through the deep facial vein and pterygoid plexus or through the angular and superior ophthalmic veins; to the internal jugular vein through the common facial vein; and to the meninges by lymphatic extension.

The conclusion at that time, and at this time, was and is that ultraviolet and short wave therapy, properly applied, will assist in the spontaneous resolution of pyogenic infections of the face, or so markedly aid in the demarcation of these lesions that surgical incision can be performed without hazard.

In this regard attention is called to the report of Maes,³ presenting 24 fatal cases of pyogenic infection in the "dangerous area" and 24 fatal cases involving other areas of the face. These cases occurred at the Charity Hospital and Touro Infirmary at New Orleans for the nine years preceding Maes' report. The causes of death were acute mediastinitis, pneumonia, pulmonary edema, septicemia and cavernous sinus thrombosis. Ninety per cent of these cases had been subjected to some trauma by the patient or the physician. And here again it is worth stressing that "lay persons must learn to keep their hands off their faces, and physicians must learn to keep their hands off their patients' faces."

The "dangerous area" of the face is a triangle which extends roughly from the angles of the mouth to the bridge of the nose. A lesion—otherwise innocuous—in this area for purely anatomic and physiologic reasons may have the most serious consequences, because all factors militate against effective localization of the infection.

To our previous report of 38 cases of nasal furuncles is now presented an additional 60 cases (table 1), 32 males and 28 females; the youngest aged thirteen, the oldest seventy-five. The duration of the lesion before treatment varied from one day to three weeks, with one case presenting recurrent furunculosis for six months. Thirty-one lesions completely resolved, 22 opened and drained spontaneously, 3 were incised, 2 were draining upon admission and 2 cases could not be followed-up. The number of treatments varied from 1 to 10 with an average of 3 per patient, which is the same number found necessary in the previously reported 38 cases.

Table 2 presents seven cases of upper lip infections. Resolution occurred in four cases and three drained spontaneously. Average treatment per case 2.2.

Table 3 presents twenty-nine cases of infections of the cheek; 19 males and 10 females. Three resolved; 14 drainage occurred spontaneously; nine were draining upon admission; two did not return and one case, cyst on right cheek, had no result. Average treatment per case 3.8.

* Read at the Seventeenth Annual Session of the American Congress of Physical Therapy, Chicago, September 13, 1938.

TABLE 1. — *Treatment of Cases of Nasal Furuncle by Ultrashort Waves.*

Case No.	Sex	Age	No. Days Before Treat.	Day of Resolution	Day of Spontaneous Drainage	Total Number Treat.	Remarks
1143	M.	35	4	2		2	
1179	M.	35	3	1		2	
1204	M.	45	3	3		3	
1270	M.	46	2	1		1	
1437	M.	21	3		1	5	
1571	M.	30	2	3		3	
1589	M.	17	1		2	3	
1665	M.	42	6	2		4	
1714	M.	40	1		3	4	
1715	M.	38	1	1		1	
1822	M.	17	3	3		3	
1903	M.	37	3	3		5	
1926	M.	23	1		*D.O.A.	2	
1928	M.	15	6 mos.	7		7	Series of furuncles
1990	M.	40	1		5	5	
2034	M.	35	3		2	4	
2045	M.	21	3	2		2	
2058	M.	75	2		5	8	
2092	M.	18	1		1	3	
2107	M.	21	2	1		2	
2151	M.	40	1	2		2	
2198	M.	42	2	2		2	
2318	M.	18	1		Incised	2	
2328	M.	31	2		3	3	
2334	M.	40	5	2		2	
2449	M.	60	1 wk.	1		1	
2527	M.	30	2	1		1	
2529	M.	42	1	1		1	
2609	M.	52	2		2	2	
2611	M.	36	2		3	3	
2630	M.	45	2	3		4	
2633	M.	56	3			3	
1162	F.	47	4	2		2	
1177	F.	38	5	Incised	3	10	Temperature 100
1326	F.	30	4		D.O.A.	4	
1337	F.	30	2	2		5	Flared up 2 weeks later
1367	F.	40	4		3	5	
1427	F.	45	Sev. wks.	4		4	
1511	F.	35	3	2		2	
1525	F.	18	2 wks.		2	3	
1611	F.	36	5		3	4	
1654	F.	34	2	4		4	
1727	F.	25	5		3	8	Recurring all winter
1733	F.	13	2	2		2	
1857	F.	35	3 wks.			1	Left town
1994	F.	38	3		2	2	
2063	F.	55	3	1		1	Herpes simplex infection of nose
2086	F.	28	5		1	2	
2206	F.	39	2		1	4	
2242	F.	21	4		1	4	
2256	F.	29	3		3	5	
2303	F.	36	2	2		2	
2319	F.	60	2		Incised	2	
2385	F.	32	3	1		1	
2461	F.	40	2		2	2	
2535	F.	55	2		1	2	
2608	F.	40	2		1	1	
2610	F.	33	2	1		1	
2631	F.	24	5	2		2	
2632	F.	44	3	2		2	

* Draining on admission.

TABLE 2. — *Infections of the Upper Lip Treated by Ultrashort Waves.*

Case No.	Sex	Age	No. Days Before Treat.	Day of Resolution	Day of Spontaneous Drainage	Total Number Treat.	Remarks
1475	M.	40	2	1		1	Infected upper lip
1456	M.	30	2	1		1	Infected herpes simplex
2365	M.	30	4	1		1	Infected herpes simplex
2654	F.	36	2	2		2	Infected upper lip
1425	F.	11	3		2	3	Furuncle on upper lip
1671	F.	23	1		4	4	Infected herpes simplex
2064	F.	50	3		1	3	Furuncle on upper lip

TABLE 3. — *Infections of the Cheek Treated by Ultrashort Waves.*

Case No.	Sex	Age	No. Days Before Treat.	Day of Resolution	Day of Spontaneous Drainage	Total Number Treat.	Remarks
1146	M.	22	1 wk.		2	2	Furuncle on rt. cheek
1272	M.	32	2		2	2	Furuncle on rt. cheek
1354	M.	33	2	1		1	Furuncle on lt. cheek
1313	M.	30	2		2	4	Furuncle on lt. cheek
1289	M.	65	1 wk.		2	3	Furuncle on rt. cheek
1245	M.	17	2		3	3	Furuncle on lt. cheek
1237	M.	35	4	3		3	2 small furuncles on left cheek
2656	M.	50	1		2	5	Furuncle on rt. cheek
2658	M.	60	3		*D.O.A.	9	Carbuncle on rt. cheek
430	M.	21	6 mos.		3	4	Infected cyst on rt. cheek
1982	M.	45	Sev. days		*D.O.A.	2	Furuncle on lt. cheek
2233	M.	26	6 yrs.		*D.O.A.	4	Cyst on lt. cheek, post-operative.
2142	M.	74	Sev. mos.		*D.O.A.	3	No results
1809	M.	24	1 wk.		*D.O.A.	2	Cyst on rt. cheek. No results
1508	M.	24	3	Left the city		1	Furuncle on lt. cheek
1416	M.	45	4		3	3	Furuncle on rt. cheek
1401	M.	25	2		*D.O.A.	3	Furuncle on rt. cheek
2662	M.	26	3		5	6	Carbuncle on rt. cheek
2814	M.	19	2		3	4	Infection on rt. cheek; had mole removed
1252	F.	16	1 wk.		3	5	Furuncle on lt. cheek; injured by picking
1373	F.	26	4		*D.N.R.	1	Furuncle on rt. cheek
1186	F.	31	1 wk.		*D.O.A.	4	Furuncle on lt. cheek; injured by picking
1185	F.	31	2		*D.O.A.	4	Furuncle on rt. cheek
159	F.	33	Sev. yrs.		3	5	Cyst on rt. cheek
1755	F.	33		3		3	3 furuncles on lt. cheek
1741	F.	33	3		2	5	Furuncle on rt. cheek
2247	F.	34	8 yrs.		*D.O.A.	11	Abscess on lt. cheek which had been operated 4 times previously. Healed
2660	F.	42	Sev. mo.			3	Cyst on rt. cheek
2425	F.	19	4		2	7	Large furuncle on rt. cheek. Temperature 99

* Draining on admission.

Table 4 presents 15 cases of 8 males, 7 females of infections of the chin cured with an average of three treatments per patient compared to previous report of 3.5 per patient. Three lesions resolved, eight drained spontaneously, two were draining upon admission, one was incised and one did not return.

Table 5 presents twenty-four new cases of infections of the eyebrow and eyelids treated by ultrashort waves. There were 8 males and 16 females; 18 resolved; 3 drained spontaneously; one was incised, one had no result and one did not return.

TABLE 4. — *Infections of the Chin Treated by Ultrashort Waves.*

Case No.	Sex	Age	No. Days Before Treat.	Day of Resolution	Day of Spontaneous Drainage	Total Number Treat.	Remarks
1200	M.	14	2		2	3	Furuncle
1360	M.	17	3		*D.O.A.	2	Furuncle
1223	M.	14	1	2		2	Small furuncle
1099	M.	25	2	*D.N.R.		2	Furuncle; swelling down after treatment
2330	M.	22	2		4	5	Infected hair follicle; glandular swelling
1468	M.	23	Sev. days		*D.O.A.	4	Furuncle
1451	M.	30	2		3	4	Furuncle
2652	M.	22	2		4	6	Large carbuncle
1299	F.	16	3		2	2	Furuncle
2267	F.	30	2 mos.		Incised	4	Furuncle
2176	F.	33	3	1		1	Furuncle
1850	F.	26	4		4	4	Furuncle
1825	F.	32	1 wk.		2	3	Furuncle
1683	F.	32	3 wks.		1	3	Three small furuncles
536	F.	45	3	2		2	Acute infection of chin and lower lip

* Draining on admission.

* Did not return.

TABLE 5. — *Infections of the Eyebrow and Eyelids Treated by Ultrashort Waves.*

Case No.	Sex	Age	No. Days Before Treat.	Day of Resolution	Day of Spontaneous Drainage	Total Number Treat.	Remarks
1317	M.	21	3		*D.N.R.	1	Rt. eyelid infection
1144	M.	60	4	1		1	Sty on left eyelid
1859	M.	46	Sev. days	1		1	Sty on left eyelid
1843	M.	22	3	7		8	Sties on both eyelids
1584	M.	36	5		2	3	Sty on left eyelid
1526	M.	14	4	1		1	Infection of left eyelid
2648	M.	32	3	2		2	Sty on rt. eyelid
2655	M.	38	2	1		1	Sty on rt. eyelid
1207	F.	34	2	2		2	Furuncle of rt. eyebrow traumatized by picking
1134	F.	28	1 yr.			21	Sty (no results)
1183	F.	30	1	3		3	Infected from dyeing eyebrow; entire side of face swollen
2205	F.	41	3	2		2	Sty on left eyelid
1689	F.	36	1/2 day	2		2	Infection of rt. eyelid
1432	F.	27	6		4	4	Furuncle of left eyebrow traumatized by picking
742	F.	32	1	2		2	Ecchymosis of eyelid with marked swelling
2367	F.	30	4	1		1	Sty on rt. eyelid
2507	F.	21	5	1		1	Furuncle of rt. eyebrow traumatized by picking
2536	F.	30	5		2	2	Furuncle of rt. eyebrow traumatized by picking
2646	F.	40	Sev. wks.		Incised	4	Sty on rt. eyelid
2604	F.	44	3	3		3	Sty on rt. eyelid
2650	F.	63	10 mos.	2		8	
2649	F.	45	3	2		2	Sty on rt. eyelid
2158	F.	40	2	1		1	Sty on rt. eyelid
1733	F.	13	2	2		2	Sty on rt. eyelid

* Did not return.

Table 6 records treatment of 21 cases of infection of the external auditory canal, to be added to the series of 8 cases reported in 1936. Ultrashort wave therapy appeals to us as being especially efficacious for relief of pain and cure of furunculosis of the external auditory canal.

TABLE 6. — *External Auditory Canal Treated by Ultrashort Waves.*

Case No.	Sex	Age	No. Days Before Treat.	Day of Resolution	Day of Spontaneous Drainage	Total Number Treat.	Remarks
1291	M.	22	4		2	2	Abscess in left auditory canal
1418	M.	45	4		2	2	Furuncle on rt. ear lobe
1447	M.	30	3	3		3	Furuncle rt. auditory canal
1506	M.	15	1 wk.	3		3	Infection behind left ear lobe
1812	M.	45	2 wks.	4		4	Furuncle on right auditory canal
1915	M.	38	4	3		3	Abscess in auditory canal
1924	M.	18	2	3		3	Abscess in auditory canal
1945	M.	16	3		1	2	Furuncle on left ear lobe
2014	M.	40	3		Incised	1	Auditory canal inflamed
2641	M.	46	1 mo.		4	6	Abscess in rt. auditory canal
2644	M.	40	3		Incised	5	Abscess in both auditory canals
1608	F.	43	(on and off for 40 yrs.)	6		6	Abscess in both auditory canals
1659	F.	25	2 mos.	2		2	Furuncles in right auditory canal
1797	F.	22	8 mos.		Incised	4	Cyst on right ear
2055	F.	35	1 wk.	2		2	Infected left ear
2158	F.	40	5	4		4	Infected ears
2342	F.	13	2	*D.N.R.		1	Furuncle in right auditory canal
2491	F.	30	2	Relieved pain		1	Pain in rt. auditory canal
2524	F.	35	1			2	Ear injury
2640	F.	12	Sev. days		1	1	Furuncle in left auditory canal
2643	F.	22	3		2	4	Furuncle in left auditory canal

* Did not return.

Table 7 adds thirty-five new cases to our last report of thirty-five cases of furuncles and boils of the neck. Thirty-two were males and 3 were females — the average number being 4.7 treatments per case. Eighteen resolved completely, 13 trained spontaneously, two were draining upon admission, one did not return, one case of furunculosis had a poor result.

TABLE 7. — *Neck Infections Treated With Ultrashort Waves.*

Case No.	Sex	Age	No. Days Before Treat.	Day of Resolution	Day of Spontaneous Drainage	Total Number Treat.	Remarks
170	M.	40	8 mo.		2	3	Cyst—infected
476	M.	53	2	3		3	Furuncle
1085	M.	20	8 wks.			36	Small furuncles all over neck. Not very good results
1107	M.	42	3	1		1	Furuncle
1193	M.	18	5		1	2	2 Furuncles
1205	M.	18	2		1	2	Furuncle
1257	M.	40	6 wks.	3		3	Series of Furuncles
1287	M.	44	1	2		2	Furuncle
1305	M.	44	3	2		2	Furuncle
1415	M.	46	4		3	3	Furuncle
1440	M.	45	4		1	1	Furuncle
1634	M.	23	4		1	4	Furuncle
1692	M.	32	2 wks.		2	5	Carbuncle
1697	M.	50	3		4	21	Large carbuncle
1802	M.	19	1½ yrs.	4		5	Sebaceous cyst infection
1854	M.	22	3		1	2	Carbuncle; temp. 101 F.
1901	M.	25	2 wks.		*D.O.A.	3	Furuncle
2030	M.	44	1	1		1	Furuncle
2054	M.	60	1	1		2	Furuncle
2113	M.	20	2		3	5	Furuncle
2216	M.	32	1 wk.	5		5	Furuncle
2217	M.	36	1 wk.		*D.O.A.	6	Large carbuncle
2243	M.	31	1 wk.		2	5	Furuncle
2249	M.	10	1 wk.	2		2	Furuncle
2298	M.	33	2	1		1	Furuncle
2435	M.	30	2	*D.N.R.		1	Furuncle
2583	M.	20	2	2		2	Furuncle
2585	M.	23	3	8		8	Furuncle

TABLE 7. — *Neck Infections Treated With Ultrashort Waves (Continued).*

2622	M.	40	1	1	1	Furuncle
2624	M.	44	2	2	2	Furuncle
2635	M.	35	4	3	3	Furuncle
2597	M.	45	8 mos.	9	9	Furuncle
1742	F.	17	4		2	Furuncle
2595	F.	62	3		2	Furuncle
2630	F.	35	8 wks.	8	8	Postoperative carbuncle — scratch by hairpin

* Draining on admission.

* Did not return.

Four cases of erysipeloid infection were treated (table 8). Resolution occurred in all with an average of 5.5 treatments per case.

TABLE 8. — *Erysipeloid Infection Treated by Ultrashort Waves.*

Case No.	Sex	Age	No. Days Before Treat.	Day of Resolution	Day of Spontaneous Drainage	Total Number Treat.	Remarks
1169	M.	52	1	5		5	Right of face
2368	M.	50	1	9		9	More marked on left side of face
2112	F.	50	1	3		3	Face
2808	F.	30	2	5		5	On eyes, nose and chin

In the course of our studies certain patients presented themselves with infections about the head which for want of more precise classification we grouped as miscellaneous. Table 9 offers an analysis of 21 patients suffering from infections ranging from furuncles, carbuncles, burns and the like.

TABLE 9. — *Miscellaneous Infections Treated by Ultrashort Waves.*

Case No.	Sex	Age	No. Days Before Treat.	Day of Resolution	Day of Spontaneous Drainage	Total Number Treat.	Remarks
460	M.	36	2		2	4	Furuncle on lt. temple.
104	M.	50	3	2		2	Furuncle on rt. side of forehead
233	M.	22	2		2	2	Furuncle near rt. ear
1402	M.	25	1 wk.		*D.O.A.	2	Furuncle under rt. ear lobe.
1576	M.	36	2		4	12	Very large carbuncle on right temple
2812	M.	29	3		*D.N.R.	2	Furuncles on forehead injured by picking
498	M.	24	1 wk.	2		2	Furuncle on temple
1292	M.	28	2		2	6	Furuncle on temple
463	M.	40	2	2		2	Severe sunburn with infection on face
2441	M.	40	5			2	Injured lt. cheek and eye; no infection; ecchymotic
270	F.	32	4		4	5	Furuncle back of rt. ear injured by picking
134	F.	25	2		1	2	Furuncle on forehead
2810	F.	23	3	1		1	Furuncle on forehead
2809	F.	20	1		2	4	Furuncle on forehead
2811	F.	36	4	2		2	Furuncle on forehead injured by picking
1700	F.	29	3	2		2	Furuncle on lower lip injured by picking
1614	F.	38	1 wk.		*D.N.R.	1	Furuncle on forehead
1217	F.	59	4		4	9	Large carbuncle on temple
1655	F.	34	1 wk.		3	4	Furuncle on forehead
2569	F.	20	4		*D.O.A.	3	Infected more on lt. cheek
2338	F.	15	4			3	Burned rt. side of face near eye. Severe pain

* Draining on admission.

* Did not return.

Technic. — A six meter wavelength instrument was used for practically all cases, with full resonance controlled by Neon bulbs. Dosage was moderate

with an endeavor to maintain a sense of gentle, agreeable warmth in and about the lesion. Over-dosage results in a bluish-red discoloration of the treated tissues and retards recovery. The average length of treatment, usually once a day, was 10-15 minutes for furuncles and 20-30 minutes for carbuncles.

Condenser glass electrodes of various sizes were used, rigidly fixed upon standards, with proper air spacing. The smaller electrode covers the lesion and surrounding inflamed area and is placed closer to the skin than the larger electrode which is used as the opposite pole.

These lesions were treated at any stage of infection and no contra-indications to treatment were apparent. Treatment almost invariably lessened local discomfort and limited the swelling, edema or induration of the infected areas. Although the lesion may not proceed to an extensive sup-puration, a relatively quick abscess formation was observed in cases that did not resolve. Whenever no distinct fluctuation was present, ultrashort wave therapy alone was sufficient; if fluctuation was marked, incision could be made without hazard.

Several cases of non-contagious parotitis were treated with rapid resolution of the inflammation and with no evidence of ulceration.

Discussion. — A discussion of all controversial aspects of ultrashort wave therapy at this time would be too lengthy. I believe ultrashort wave diathermy to be a superior form of heat therapy, indicated for the treatment of pyogenic infections at any stage of the lesion; that it is analgesic and antispasmodic, and that it can produce an intense and lasting hyperemia.

The physiologic aspects of the effect of ultrashort wave diathermy upon the lymphatic system have not been demonstrated. In all our cases, without exception, when lymphangitis or lymph adenitis was associated with infections, such lymphatic manifestation regressed to disappearance with ultrashort wave therapy. This may explain the efficacy of this therapy in facial infections because of the rich lymphatic supply of facial connective tissue.

References

1. Egan, W. J.: Ultrashort Wave Diathermy in Pyogenic Infections, *Arch. Phys. Therapy* 17:688 (Nov.) 1936.
2. Totten, H. P.: The treatment of Carbuncles of the Face, *West. J. Surg.* 43:609 (Nov.) 1935.
3. Maes, U.: Infections of Dangerous Areas of Face; Their Pathology and Treatment, *Ann. Surg.* 106:1 (July) 1937.

(For discussion, turn to page 339)



RATIONALE OF SHORT WAVE DIATHERMY IN ACUTE SINUSITIS *

FAREL JOUARD, M.D.

NEW YORK

During the past ten years many articles have appeared on high frequency treatment of acute sinusitis. Long wave diathermy at first had its champions, but gradually, owing to the excessive milliamperage used by inexperienced or incautious operators, and the consequent increase of discomfort frequently induced thereby, together with the undependable results obtained, this method of treatment fell into disrepute. Later, the use of vacuum and other condenser electrodes enjoyed a season of popularity, but lack of uniform success eventually led to general loss of interest.

More recently, short wave diathermy has been enthusiastically advocated in acute sinusitis. In estimating this enthusiasm at its true value, one must first of all discount the high-pressure methods which prompt salesmen to grasp at a straw and picture it to the gullible physician as a harvest of golden grain. On the other hand, it would be hardly logical to accept as final and conclusive the dictum of the Council on Physical Therapy which quite properly condemns for the time being the featuring of short wave apparatus for the treatment of sinusitis. Between these two extremes lies a wide margin of opinions which, I believe, are on the whole favorable to the use of this method in acute sinusitis. The great number of rhinologists who use short wave generators more for this purpose than for any other, is a fair indication of a certain measure of approval.

As far as the apparatus is concerned, it has everything in its favor. The very simplicity of its application cannot fail to be a joy to the most indolent operator (not to speak at all disparagingly) or to the least mechanically inclined. There is no need of specially fitting electrodes nor of moist pads, nor even of getting one's fingers wet. Furthermore, the danger of hot spots and blisters, ever to be guarded against with long wave diathermy, is practically unknown with the short wave type.

Rationale of Short Wave

All of these advantages, however, would be of no account but for the definite physiologic value of the oscillations. And here let us briefly consider what pathologic process confronts us in a case of acute sinusitis, and whether short wave diathermy can in any way correct this condition.

The acute attack usually originates with an infection of the nasal and pharyngeal mucosa, with turgescence of the turbinates, which infection later extends into the lining of the adjoining sinuses. This lining becomes swelled often to such an extent as to block the ostia completely, thus preventing natural drainage. Usually a heavy mucous, and sometimes a purulent exudate is thrown out, causing dullness and pain in the affected region.

The healing forces of nature operate by developing antibodies to overcome the infection and by relieving the congestion of the mucous membranes. This, of course, is what any therapeutic procedure should aim to accomplish. In the early stages, it is remarkable what a relief is experienced by the patient from a few moments of short wave exposure. There is no rea-

* Read at the Seventeenth Annual Session of the American Congress of Physical Therapy, Chicago, September 13, 1938.

son to suppose that such treatment has a direct bearing on the problem of disinfection, but according to various reported observations and deductions, one of the chief effects of short wave diathermy is an increase in the peripheral circulation, which seems to relieve at once the congestion of the deeper tissues. That this is plausible is shown by the fact that the reverse of this process is a matter of common experience. How often, for instance, do the symptoms of vasomotor rhinitis appear immediately upon setting the bare foot on a cold floor, or allowing a cool breeze to play upon the chest or the back of the neck. Furthermore, this beneficial effect of the short wave does not seem to require high current intensity; in fact, the lower intensities sometimes act more rapidly than the higher ones. Nor does wavelength seem to have any special connection with this particular action. Good results have been observed with all kinds of waves between 6 and 24 meters. It would seem that in the treatment of the early stages of sinusitis, short wave therapy is justified and is here to stay until something still better will be found.

Suppurative Sinusitis

The problem of managing sinus empyema, however, involves other considerations. According to prevalent opinion the application of diathermy to an undrained pus cavity is contraindicated, as increasing pain, favoring extension of the suppurative process and eventually causing rupture into possibly dangerous channels. There is no question but that local heat production can rightly be charged with every one of these faults, but when an athermic dose of short wave diathermy is used, the objection at once disappears. Again it is repeatedly urged that sinus empyema is a surgical condition and should be treated surgically and only surgically. This rule, however, can be accepted only with pronounced reservations. It is quite true that maxillary sinus puncture and drainage is a simple and same procedure and certainly is the method of choice in empyema of that cavity. With the other paranasal sinuses, puncture and drainage are less simple and much less safe, and enlightened laymen, nurses and physicians (especially rhinologists) suffering from empyema of these cavities do not seem at all eager to undergo this procedure. It is in these latter types of cases that short wave therapy, athermic, is warranted and to be recommended as a preliminary measure, at least while waiting for the nurse to sterilize the trocars, rasps and biting forceps. In my own experience, not to mention that of others, more than one patient mentally booked for the operating chair, has suddenly experienced a copious discharge of pus and complete cessation of pain during the first five or ten minutes of mild short wave treatment.

Discussion of Papers by Drs. W. J. Egan and Farel Jouard

Dr. Frederick L. Wahrer (Marshalltown, Iowa): To a certain extent I can confirm the results which Dr. Egan has obtained. I have had occasion to treat quite a few furuncles and some carbuncles of the head and neck. Most certainly these infections are markedly reduced as to time, and the usual stormy course is very much abated. We find that with one or two treatments pain is greatly lessened, swelling and inflammation are decreased.

As to Dr. Jouard's paper on the sinus question, I feel that short wave gives perhaps the best results in the acute type. My experience in treating chronic sinus infections with short wave has not been impressive. I find that most cases need

something more. Essentially I feel that these are surgical problems in which short wave is merely an adjunct in the after treatment. But I frequently use infra-red heat, and get just as good results with the infra-red lamp as I do with the short wave.

As regards short waves in acute inflammation, I do not like the word "miraculous" as applied to these cases. However, it is rather astonishing sometimes to see what one or two treatments will do in acute infections, in the way of reducing swelling, allaying inflammation, and what is even more important from the patient's standpoint, the manner in which pain is so remarkably alleviated in a short time.

That is something in which patients are most interested. One or two treatments in the majority of cases will give great relief.

Dr. Norman E. Titus (New York): I have but two things I wish to mention in connection with Dr. Egan's paper. The first is an interesting case and the second a new technic (as far as I know) in localizing the effects of short wave for the treatment of minor infections. A woman, seventy-nine years old with chronic arthritis so that she could not stand erect and with chronic lymphatic leukemia of over forty-five years' duration, developed a carbuncle 10 cm. in diameter in the left gluteal fold. Operation was considered and undoubtedly would have meant death.

Using a 6-meter apparatus and one-half its output, I placed one pad under the lesion with about a half inch of toweling, and the other on her right knee, which was painful because of the arthritis. After nine daily treatments the carbuncle which had had a slough as big as a thumb nail was practically healed. I do not say completely healed because the opening was about a millimeter deep and two millimeters wide, with no slough and no induration.

This is just an example of one of many I have seen worthy of mention because it is so typical of what short wave diathermy can do in infections.

Last fall I developed an infection of the left lacrimal duct and consulted the chief of the eye service. As he could not get a probe in, he suggested the use of poultices and to have it later incised. I reasoned that if short wave diathermy was good for skin infections, it might work in my condition; but the question was how to get the current there without burning my nose. I finally evolved the technic of putting one electrode ten inches behind my skull, with the other about three inches in front. I then put my hand parallel to the electrode in the field between it and my face, crooking one finger at a right angle. In that way my hand was collecting all the electrical forces from the field in front of me and concentrating them on my finger. I placed this finger over the lacrimal duct and in less than ten seconds, it became so hot I had to remove it. I did this four or five times and the next morning the entire infection was gone.

I have done this in a number of cases of furuncles on the nose and back of the neck and other small infections where I wanted to localize the short wave current. Briefly the technic consists of placing the hand in the plane of one of the condenser plates with one finger crooked at a right angle, so that all the lines of force go down the finger in contact with the furuncle. If there is not good contact, a spark is generated, so it is necessary to press firmly. Local heat is created quickly and it is necessary to remove the finger, replacing it three or four times. With this technic the furuncle will soon disappear.

I am never happy about giving diathermy through the brain. The results, however, in treating sinusitis are so inspiring and consistently successful that it is worth while to use it laterally and antero-posteriorly through the head, even though we may find in time that the risk is great. I am never sure when giving this treatment just what may be a latent effect of short wave on the lens of the eyes.

My chief comment about this paper is that no mention was made of necessity of preparing the nasal cavity for short wave diathermy. If there is congestion in any of the sinuses of the head and heat is applied to them, the congestion will be increased unless some step is taken to allow immediate relief. By this I mean it is most important to first shrink down the nasal mucous membrane so that the natural opening of the sinuses may be available to give relief from the pressure increased by the treatment.

Although I have never seen blisters in treatments for sinusitis, this procedure must not be carried out without realizing that incorrect application of the treatment may cause excessive heat on the tip of the nose and possibly blistering.

For over fifteen years I have been treating hay fever with the non-vacuum electrode and ultraviolet with the quartz applicator applied to the nasal cavity. Experience showed that the action of ultraviolet light was most beneficial and as in the old days we believed it also was germicidal, this power was credited with being the cause of the added effectiveness of the treatment. Researches in the treatment of erysipelas with ultraviolet light, have shown that this agent is not germicidal in vivo, but it was justly concluded that its effect was to increase local and general immunity to infection. This effect probably is most active in nasal infections and I believe it to be largely responsible for the great success I have had in the treatment of acute and chronic sinusitis with short wave plus a one minute application of cold quartz in each nostril.

The essayist very properly warns against using currents of high intensity. With this I agree, but I can not say I am in any way convinced that athermic short wave diathermy that has been talked about so much during the past year is of any therapeutic use. No one has shown that the effects of short wave diathermy are anything but heat and if we use the athermic technic, we do not generate effective heat in the tissues. I do believe that after we have tuned the circuit at the maximum output, the dose immediately should be materially cut down so that the patient experiences a minimum sensation of heat.

Let me add that if this procedure is instituted with well governed enthusiasm and a realization of the underlying pathologic process, it will be found of extraordinary benefit in a large majority of cases.

Dr. O. E. Van Alyea (Chicago): I should like to know if it is the common practice to associate the treatments with irrigation of the sinuses, for example, and if so, which is done first, and the technic used? Assuming that one irrigates an antrum, is the heat introduced before the treatment or after? Another question is, whether treatment should be given daily?

Dr. Meyer Gorin (Rochester, N. Y.): There is one question that I should like to ask. The speakers have all spoken rather promiscuously of short wave and referred to a 6-meter or up to a 24-meter wavelength. It is my impression that a 10-meter wavelength is the dividing line between the ultra-short wave and the short wave. Which did they mean? Which is the more efficacious? How does that stand as compared with the induction method?

Dr. J. I. Thorne (Miami, Fla.): Is any form of cable treatment used instead of pads?

Dr. N. S. Burnap (Fergus Falls, Minn.): All the speakers warn about too long a treatment, and suggest a short treatment of six to ten minutes. What happens if you run it over fifteen, or what are the real objections to a little more time?

Dr. William J. Egan (closing): We have treated cases as long as twenty minutes. It stands to reason that a large carbuncle calls for more heat — more treatment. There is no sense in treating a small one any longer. These treatments produce intense hyperemia and swelling, and we have found that the optimum time is ten or twenty minutes depending on the size of the lesion. We bring it to the optimum intensity immediately.

There are a number of other problems that were not mentioned. When one encounters those annoying dental infections after extraction or before extraction, when one encounters infections following plastic surgery, pyogenic infections or a fractured jaw, one should not hesitate to use ultra-short wave therapy. Secondary infections of the eyelid which do not respond to anything else, should be subjected to ultra-short wave therapy. Our series of cases have had also an excellent cosmetic result.

In treating the eye it is best to apply a swab of cotton and soak up the moisture. We have had no burns about the eye, and we have had only one or two

small ones on the whole body. In regard to the skin, use the filter paper used in the laboratory. It is an effective way of absorbing moisture.

I want to call your attention to a procedure practiced abroad. This refers to the short wave treatment of a focus, such as the teeth, in arthritis. They are performing a series of experiments by heating the teeth, taking the blood count and sedimentation rate before treatment and after, and in those cases with an increased sedimentation rate they maintain that removal of the teeth may prove of benefit. If there is no blood change and no change of the sedimentation rate, they anticipate no improvement from the removal of focal infection.

Dr. Farel Jouard (closing): As to the question of athermic short wave treatment, I must say that the term is only a relative one. By "athermic" we mean a treatment which cannot be felt by the patient as producing heat. However, I have seen many such treatments produce perspiration on the patient's head and neck after ten or fifteen minutes' treatment. So they are really not athermic. There is a certain degree of heat produced, so that by "athermic" we mean treatments which do not produce perceptible heat, and in connection with this I might say that I have given many such treatments through the skull and I have never yet noticed vertigo if the patient did not feel heat going through the head. If they do feel heat they are very likely to notice vertigo in a short time. Also I think it is perfectly safe to give treatments that way if the duration of the treatment is short, five minutes usually, ten minutes being the limit.

About irrigation of the sinuses, the treatments for acute sinusitis that I mentioned were generally an attempt to avoid radical surgery. In antrum empyema, I think irrigation is indicated. That is the first thing one would do, and it is optional whether you are going to use any short wave diathermy or not. If you obtain relief by irrigation and clearing the sinus from pus, then one would not need short wave diathermy. In the case of frontal or sphenoidal empyema, or some such condition in the ethmoidal cells, I think one is justified in making short wave application first before anything more radical is undertaken.

STATUS OF TRANSURETHRAL PROSTATIC RESECTION

HU C. MYERS, M.D.

The Myers Clinic

PHILIPPI, WEST VIRGINIA

Urologists have long recognized that certain pathologic formations at the bladder neck could be completely relieved by excision of a very small amount of tissue. In the century and a quarter that has transpired since Sir William Blizard¹ introduced his instrument as perhaps the earliest for transurethral surgery and Bottini with his innovation of surgery by the electric current, the procedure was classified as among the dangerous novelties of surgery until the perfection of the underwater high frequency cutting and coagulating current permitted the safe exploitation of this newest and simplest of electrosurgical methods in urology.

When modern resection was first introduced it was thought to be useful only in small obstructions, such as sclerosis at the bladder neck and the so-called median lobe hypertrophies. As the technic has been perfected, a greater number of urologists are using it for all but the very large adenomas. Caulk and Davis² have not found any cases which they thought were not suitable for resection; Engel³ uses it in 98 per cent of his cases; Thompson⁴ advocates its use in all cases in which a suitable instrument can be passed; Ballenger⁵ states that 95 per cent of prostatic obstructions can be relieved by experienced resectors; Bugbee⁶ thinks that 75 per cent can be cured with resection; Collings⁷ does not use it as frequently as he did; and Hinman⁸ says that 80 per cent of urologists prefer open operation for the large prostates. It is safe then to say that urologists who employ transurethral resection consider the operation applicable to between 75 and 100 per cent of obstructive lesions, with perhaps an average of 85 per cent. There are still many competent operators who use it only rarely.

It has been repeatedly emphasized by exponents of transurethral surgery that resection is an operation that requires skill and judgment above that associated with suprapubic prostatectomy. It should be undertaken only by one who is familiar with the anatomy of the bladder neck, and the pathologic changes that follow enlargement of the prostate. The operator should be skilled in the use of electric currents and the precise instruments necessary for the completion of resection and control of possible hemorrhage. He should also be familiar with urologic procedures in general, and in particular with any emergency complication which might ensue. Resection is not an office procedure but should always be done in a well equipped hospital.

Thompson⁴ has presented photographs of specimens removed at autopsy which conclusively demonstrate that the ultimate urethral deformity is less following resection than after prostatectomy. He says: "Recurrent urinary obstruction following transurethral resection will be infrequent if the primary operation is thorough. . . . Up to the present the percentage of cases in which urinary obstruction has recurred after transurethral resection is much less than had been predicted."

Davis² reports that in 748 cases only 24 recurrences of obstruction required subsequent resection. He also states that he has resected 46 prostatectomized men within five years after their prostatectomy.

Mathé and Bellescía⁹ report a mortality of 11.7 in 162 cases of prostatectomy and 1.3 per cent in 72 resection cases. They employed resection in the very bad risks in whom it was considered unsafe to perform the more radical open operation, as well as on those presenting smaller obstructions. From this they conclude that resection is the more benign procedure, is accompanied by less shock, and is followed by a smaller number of grave complications.

Preparation and Procedure

It is our routine procedure to obtain a report of the patients' blood urea nitrogen, phenolsulphonephthalein test, blood count, bleeding and clotting time, Kahn test, and a complete physical examination on all patients that present themselves with suspected vesical neck obstruction. If the bladder seems to contain over five ounces of residual urine, it is decompressed by connecting an indwelling catheter to a sterile tube attached to an inverted bottle hanging by the bed. The bottle has an overflow four inches above the receiving tube, the intervening space being filled with boric acid solution which acts as an equalizing reservoir. It is placed at such a height that the urine barely runs into it, and is lowered one inch every hour until it is level with the bladder. Decompression by this method is accurate and minimizes preoperative reactions. Preoperative preparation usually covers one to seven days. No operative procedure is attempted until acute infection has subsided, renal function has been improved and stabilized, and the physical condition of the patient is near his optimum.

The technic of transurethral electrosurgery has been adequately covered in the literature. The method which I have used follows closely that of Davis, with the exception that not as much tissue is removed as is his practice. Suffice it to say here, high settings on the cutting unit and swift, clean cuts yield the best results. Enough tissue is removed to form a cone-shaped channel through the prostate, the base of the cone being at the bladder neck and the apex at the verumontanum. The floor of the prostatic urethra is especially attacked, so that the new floor forms a straight line from the verumontanum to the trigone. Hemorrhage is controlled by touching each individual vessel lightly with the loop, and applying the minimum amount of coagulating current that will produce hemostasis. When no more bleeding points are seen and the solution returns clear, a No. 20 whistle-tipped catheter is inserted and strapped in place. The bladder is only irrigated when there is hemorrhage or the catheter is not draining. On the third or fourth day, after filling the bladder to tolerance with warm boric acid solution, the catheter is removed and the patient immediately allowed out of bed to void. If he fails to void, the catheter is reinserted at once and left two or three days more. At that time a secondary resection is considered if his flow of urine is inadequate. If he is voiding freely, he is allowed to go home in from one to three days.

Variations in the technic are common. Smith and Stockwell¹⁰ employ light coagulation of the prostate and frequently suprapubic drainage. Thompson and others use a cold punch, but employ electrocoagulation to control hemorrhage; Caulk, a cautery punch; Kirwin, a vesical neck resector of his own design.

Common Complications

Hemorrhage. — Immediate bleeding which was very difficult to control, was common in our cases during the period when we were using an undamped, or tube type of current for cutting purposes. After adopting a spark-gap generator with a damped current, hemorrhage has been negligible.

It is the opinion of many urologists who have been unusually successful in their resections, that the use of a powerful spark-gap generator, which delivers a current flexible enough to be adaptable to any type of tissue, and yields a minimum of dehydration for adequate hemostasis, will obviate this distressing complication.

Retention of Urine. — This will be prevented by resection of an adequate amount of tissue including all that is projecting into the bladder, excision of lateral lobes which tend to fall in after the median lobe has been resected, or adenomatous nodules which have enucleated themselves after the adjacent tissue is removed, and removal of all loose pieces which have fallen into the bladder.

Sepsis. — This can be controlled by gentleness in all manipulations, careful asepsis, administering mild urinary antiseptics and large amounts of water, waiting for acute infection to subside before operation, removing only prostatic tissue, and using a minimum amount of coagulation.

Post-Operative Stricture. — Technically this complication can be avoided by use of good lubrication, care in passing of instruments, and keeping the sheath cool by using its opening for the irrigating fluid. Bumpus¹¹ makes clear that the passage of a resectoscope by force is inexcusable, and states that a prostatectomy should be done rather than unduly traumatize a small urethra by intraurethral instrumentation.

Incontinence. — Staying behind the verumontanum, and making cuts in this vicinity toward the bladder rather than toward the operator, will insure a preservation of the external sphincter and thus prevent incontinence.

Periurethral Abscess. — This can be avoided by employing asepsis in the passing of instruments, using a catheter small enough to allow urethral secretions to pass around it, keeping the penis from hanging forward so as not to cause an ulcer at the peniscrotal junction, changing the catheter and irrigating the urethra at fairly frequent intervals should be practiced. One should also daily palpate along the urethra to see if an abscess is forming.

Report of Cases

I have made no attempt to secure a large series of resections, believing that it was better to feel my way carefully and advise this operation only in selected cases. Thirty-one private patients have been treated by this method over a period of three and one-half years. Most of them were patients with advanced prostatism, nine being such poor operative risks that they would not have been considered as able to go through the ordeal of a prostatectomy. Among the complicating factors present were: Carcinoma of the prostate, 5; advanced uremia, 3; diabetes mellitus, 2; vesical calculus, 3; diverticulum of the bladder, 2; hypertension, 7; urinary infection, 25; arteriosclerosis, 14. All of the patients had residual urine and eleven had complete retention, in two cases the bladder being distended above the umbilicus. The oldest patient was 88 years, the youngest 50, the average 67. Omitting one patient who was in the hospital two months for treatment of morphinism and almost the same length of time following suprapubic removal of a large vesical calculus and two resections for a large prostatic hypertrophy, the average duration of hospitalization was 14 days. The shortest hospital stay was 4 days, the longest, 64.

There were three hospital deaths. The first was from sepsis. An autopsy performed 27 days after resection, revealed a large retrovesical abscess and general peritonitis. I believe the abscess was due to trauma in reinserting a suprapubic Pezzar catheter and not to the resection. The second death occurred five days after operation from cerebral hemorrhage with right hemiplegia. The third was from pulmonary edema with right hydrothorax com-

ing on ten days after a secondary resection. The patient's convalescence until that time had been tedious due to his advanced age of 88 years, coupled with atony of the bladder and the presence of a large inguinal hernia which inhibited straining.

There were four moderately severe post-operative hemorrhages, of which two ceased spontaneously while being frequently irrigated; the others requiring suprapubic cystotomy and introduction of Pilcher bags. One of the latter patients also had a hemorrhage 18 days post-operatively and had to return to the hospital for reintroduction of the hemostatic bag. He subsequently developed a urethral stricture. The other, a diabetic, developed a periurethral abscess which required incision and drainage. With the exception of hemorrhage, all of the complications in this series of cases occurred in those patients in which a suprapubic cystostomy was done.

Four patients have subsequently died: one from lobar pneumonia five months after resection, one from extensive metastases from his carcinoma three years after operation, one from carcinoma and a pathologic fracture of his hip three years after resection, and one two months after operation. Death in this latter case occurred suddenly following a meal and was probably due to coronary occlusion.

May I call attention to the greatest good which resection has done aside from the early relief of prostatism. Formerly there were two classes of patients requiring permanent cystostomy: those with advanced malignancy, and those whose poor physical condition would not warrant the risk of prostatectomy. Following cystostomy such a patient was a social outcast and was always miserable due to the constant care necessary, odor, leakage and drainage about the tube and tenderness of the wound. He had to have frequent bladder irrigations and regular painful changes of the tube. The thought of coming to such a state was anything but inviting. With the advent of transurethral resection of the prostate, indications for performing a permanent cystostomy have almost disappeared.

If we can give relief to this class of unfortunate patients, if we can prevent the series of events which we call the vicious cycle of prostatism, and thus add five to ten years of comfortable life by timely intervention when the obstruction is at its beginning, we shall indeed feel that we have seen brought under effective control, a disease which has so long been an anathema to men in their declining years.

Conclusions

1. Unfortunate results from prostatic resection have been largely due to inexperience, lack of proper preoperative preparation, and to the use of inadequate or unsuitable current generators.
2. The use of a flexible and powerful spark-gap generator will make the operation easier and the results better.
3. Enough time has now elapsed to demonstrate conclusively that further hypertrophy of the prostate rarely ever occurs when enough tissue has been removed to allow the patient completely to empty his bladder.
4. Adequate resection produces a permanent channel except in case of malignancy.
5. In advanced malignancy resection is usually the operation of choice and has largely replaced cystostomy.
6. Resection will continue to replace prostatectomy in at least 85 per cent of obstructive lesions.

(Concluded on page 368)

CLINICAL RESULTS OF FEVER THERAPY *

EARL C. ELKINS, M.D.

and

FRANK H. KRUSEN, M.D.

Section on Physical Therapy, The Mayo Clinic

ROCHESTER, MINNESOTA

Since the inauguration of our Fever Therapy Department in December, 1933, 778 patients have been given approximately 3,160 treatments, exclusive of brief treatments of less than two hours. In reviewing the records, it was observed that in approximately thirty-five different diseases or conditions most of which were encountered in the first two years, treatment was by the use of fever cabinets. This report will deal with the results obtained in the treatment of gonorrhea, chorea and undulant fever.

At the beginning of our use of artificial fever therapy a series of 111 patients who had chronic infectious arthritis received the treatment for periods of five or six hours at a time. In the past three years very few patients suffering from this disease have been subjected to long sessions of artificial fever because the results did not seem to justify the use of such a rigorous procedure. During the past five years thirty-nine patients who had syphilis have received this therapy as part of their treatment, but the subsequent course of these patients has not been followed or analyzed as to clinical results in a sufficiently satisfactory manner for presentation.

Gonorrhea

Gonorrhea has held the most important place in the use of fever therapy in our department. There have been approximately 500 cases in which a definite or tentative diagnosis of gonorrhea was made and treatment was given. In these cases a great many complications of gonorrhea were present. Some of these patients, particularly those who had arthritis, were treated by means of artificially produced fever purely on the basis of a history of gonorrhea, but without obtaining positive evidence by culturing various secretions. For this reason such cases were excluded from the series reported in this paper. Likewise, other cases were omitted from this analysis because the treatments given were incomplete owing to nervous instability of the patient or some complication that arose in the course of treatment.

At present, we have analyzed the results obtained in the treatment of 415 patients who have had a definite diagnosis of gonorrhea, positive cultures and satisfactory treatment. In 94.1 per cent of this group, one to five negative cultures for *Neisseria gonorrhoeae* were obtained from the urethra or cervix after treatment.

From 1933 to 1936, the procedure consisted of inducing a bodily temperature of 106.7 F. (41.5 C.) for six hours. The average number of treatments administered to each patient was 5.4. We encountered a few cases in which remissions of the gonorrheal infection occurred after many sessions of fever therapy. Thus, in cases previously refractory to six-hour sessions of fever, we began to utilize in the latter part of 1936 a single session of high fever as recommended by Warren, Carpenter and Boak. The impression was that if patients could be given ten-hour fever treatments

* Read before the Seventh Fever Conference, St. Louis, Missouri, November 11 and 12, 1938.

with reasonable safety, the number of treatments necessary might be lessened; also such a treatment might make it possible to have fewer failures on account of the patient's refusal to undergo a series of 5 or 6 six-hour sessions. Another reason why such a system was inaugurated was that in a few cases, as many as 12 five-hour or six-hour sessions of fever had been administered without effect, whereas if the duration was increased to ten or twelve hours, a single treatment was nearly always successful.

Therefore, early in 1937 we started a new routine. Our procedure was to give patients a preliminary conditioning treatment consisting of a hot tub bath and an erythema dose of ultraviolet radiation on the day before the fever session. The next day the patient was subjected to a long session of fever maintaining his bodily temperature at 106.7 F. (41.5 C.) for ten hours. Up to July, 1937, we treated, or attempted to treat, 113 patients. Of these, 68 were men and 45 were women. Seven of this group did not complete treatment because of nervous instability or some complication, usually an excessively high pulse rate or sensitive skin. In seven cases positive cultures could not be obtained prior to pyretotherapy. Therefore, of 99 cases in which positive cultures were obtained before treatment, in 93 or 93.4 per cent, cultures were negative after treatment.

Formerly, prior to the institution of the long sessions of fever therapy, when cultures failed to become negative during the usual routine, we attempted to increase the percentage of remissions by augmenting the fever treatment with local applications of heat. Bierman and Horowitz previously had shown that fever plus local heating by means of high frequency current was of value in pelvic inflammatory disease. Simpson mentioned that the combination of fever therapy and Elliott treatment in a score of cases of chronic inflammatory disease had lessened slightly the required number of applications.

Therefore, it seemed logical to use local heating whenever possible in conjunction with fever therapy. Up to the middle of 1936 we had a series of 42 patients, most of whom proved refractory to the usual routine. In six cases of extremely refractory pelvic inflammatory disease we were forced to administer fever at 106.7 F. (41.5 C.) for twelve hours with local heating in the pelvis for two hours. In none of these cases did we fail to obtain final disappearance of positive cultures. Two men who had prostatic abscesses obtained clinical remissions when the effect of heating of the rectum was added to that of fever therapy. One man who had gonorrheal conjunctivitis showed great improvement when diathermy to the eye was added to the routine measure. Of 37 women with pelvic inflammatory disease, 20 had chronic gonorrhea, 3 had subacute and 14 acute gonorrhea; in 86.5 per cent of these cases negative cultures were obtained after treatment.

As a result of these studies we began to use local heating in the pelvis routinely in all cases of gonorrheal infection of women. Our method at present is to use the Bierman-Horowitz vaginal applicator and belt electrode with conventional diathermy. The patient's bodily temperature is elevated in the usual manner in the cabinet and is maintained at 106.7 F. (41.5 C.) for five or six hours of the ten-hour session. At about the middle of the session, the temperature of the body is reduced to 103 to 104 F. (39.4 to 40 C.). The temperatures are then stabilized as well as is possible by recording those of the axilla, mouth and rectum. Heat is then applied locally in the pelvis. The vaginal electrode has an indwelling thermometer which indicates the approximate temperature of the pelvic tissues because the electrode itself does not attain a temperature higher than that of the surrounding tissues. The rectal temperature readings are continued. Maintaining the oral and axillary temperatures between 103 and 104 F. (39.4 and 40 C.),

the pelvic and rectal temperatures are raised and maintained between 107 and 110 F. (41.7 and 43.3 C.) by use of the diathermy for the remainder of the ten or twelve hours of the session.

We feel that this procedure carefully carried out is probably safer than the mere maintenance of systemic heat at 106.7 F. (42.6 C.) for ten or twelve hours. We also have the impression that this procedure with the added elevation of pelvic and rectal temperatures is more efficacious than the fever alone.

There were two cases in which we are convinced that we could not have obtained negative cultures had it not been for the local heat in the pelvis. One woman, aged 51 years, had gonorrheal cervicitis, urethritis and a pelvic mass. It was thought, therefore, that the patient was too old to withstand a prolonged session of high fever. She was given one treatment; her bodily temperature was maintained at 106 F. (41.1 C.) for one hour and then was lowered to 104 F. (40 C.). For six hours the axillary and mouth temperatures were 104 F. (40 C.) and the pelvic and rectal temperatures were maintained between 107 and 109 F. (41.7 and 42.8 C.) by means of pelvic diathermy. After this treatment the cervical and urethral cultures were negative.

Another patient was a woman aged 57 years. Positive cultures were obtained from the cervix and the urethra. The patient had arthritis of the fingers of one hand. She had been hospitalized and had been given large doses of sulfanilamide. The concentration of this drug in the blood was greater than 9 mg. per 100 cc. During this time heat was applied to the pelvis by means of conventional diathermy, utilizing a vaginal applicator for eight hours without appreciably raising the bodily temperature. But despite an increase of the temperatures in the pelvis to levels between 107 and 110 F. (41.7 and 43.3 C.), positive cultures continued to be obtained. Fever therapy was finally attempted. The patient was given a five-hour session of artificial fever and then a six-hour session during which the axillary and oral temperatures were elevated only to 103 and 104 F. (39.4 and 40 C.) while the vaginal and rectal temperatures were maintained by means of vaginal diathermy between 107 and 110 F. (41.7 and 43.3 C.). After these treatments growth of *Neisseria gonorrhoeae* was not obtained on culture and the patient was finally dismissed as cured.

As mentioned, the rectal and vaginal temperatures can be elevated to 106 or 108 F. (41.1 or 42.2 C.) with pelvic diathermy alone. Therefore, the rectal temperatures alone cannot be used in gauging the bodily temperatures when fever and diathermy treatments are combined. For this reason, oral and axillary temperatures are recorded as added controls. Readings of oral temperatures may be 3 to 4 F. (1.7 to 2.3 C.) below the actual bodily temperatures for a number of reasons: (1) Under normal circumstances the oral temperatures are 1 to 2 F. (0.5 to 1.1 C.) below the rectal temperatures. (2) During a fever treatment the patient is drinking ice water. (3) Late in the treatment, if the reaction is great, the patient will not hold the mouth closed. Axillary measurements to a great extent cannot be depended on because the patient may not hold his arm close to his body and the heat in the cabinet may affect the thermometer.

We have noted, also, that the pulse during this procedure does not drop to the levels that would indicate a bodily temperature as registered by the oral thermometer. Not infrequently with rectal and vaginal temperatures at 107 to 110 F. (41.7 to 43.3 C.) and the oral temperature as low as 102 F. (38.8 C.), the pulse rate will still remain at approximately 130 per minute.

In one case in which treatment by this means was carried out, the vaginal and rectal temperatures were maintained by local applications be-

tween 108 and 112 F. (42.2 and 44.4 C.) and the oral temperature was 104.8 F. (40.4 C.). Suddenly symptoms of heat stroke developed with pulmonary edema and convulsions. Fifteen minutes after local heating of the pelvis had been discontinued, the rectal temperature was still 108 F. (42.2 C.), although that of the mouth had never been more than 105 F. (40.6 C.).

Another patient whose oral and axillary temperatures were being maintained at about 104 F. (40 C.) and whose vaginal and rectal temperatures, as a result of pelvic heating were being maintained between 107 and 109 F. (41.7 and 42.7 C.) became comatose and showed indications of heat stroke. Apparently her systemic temperature was considerably higher than was indicated by the oral temperature.

Therefore, we are convinced that the oral temperature should not be maintained above 104 F. (40 C.) during these combined treatments. Any sudden elevation in the oral, rectal and vaginal temperatures should be considered as a possible indication of excessive pyrexia. Likewise, the patient should be observed carefully during this particular procedure. The danger sign is sudden elevation of the temperature, pulse rate or blood pressure, or early indications of coma.

We have not continued to use the vaginal Elliott applicator because the patient is much more uncomfortable with this than with other types of pelvic heating and also because it is almost impossible to keep the Elliott appliance in place for long periods. When the vaginal Elliott treatment is given in the fever cabinet there may be rather serious sloughs, whereas with vaginal diathermy, such lesions have not been encountered.

The criteria for determining the probability of clinical cure before dismissal of patients who had gonorrhea were definite clinical improvement and at least four negative cultures for *Neisseria gonorrhoeae*, with one post-menstrual culture in women. Although these observations had been used as standards ever since the beginning of the use of fever in the treatment of gonorrhea, we were not certain of the significance of such criteria with regard to prognosis. Therefore, in 1937, questionnaires were sent to all patients who had received treatment. In eight (4 per cent) of the 198 reports received, it was stated that recurrences had been experienced. One took place seven and another twenty-four months after treatment. These are suspected of being reinfections rather than recurrences of the original infection. In addition one other patient later admitted that reinfection had occurred. So we know that recurrences were experienced in probably not more than 5 or less than 3 per cent of cases.

Prior to the introduction of sulfanilamide, twenty to forty patients who had gonorrhea were being given fever therapy at the clinic each month. With the advent of sulfanilamide the use of artificial fever in the treatment of gonorrhea immediately declined. It almost seemed that as far as gonorrhea was concerned, fever therapy might become just one more therapeutic measure relegated to the past.

However, there is a certain percentage of failures when sulfanilamide is administered for gonorrhea; various investigators have reported failures in 10 to 50 per cent of cases. It was stated last winter by E. N. Cook of the Section on Urology of The Mayo Clinic that it was possible to cure more than 90 per cent of patients who have gonorrhea by administering sulfanilamide combined with local medication. The practice has been to start routine treatment with sulfanilamide in all cases of gonorrhea; if in ten days the condition has not been definitely improved, as noted by disappearance of the discharge and improvement in the microscopic appearance of the urine, the advisability of fever therapy is considered.

Randall⁷ of the Section on Obstetrics and Gynecology stated last March that a conservative estimate of the data accumulated at that time would indicate that remissions could be expected in 80 to 90 per cent of cases of gonorrhea of the genital tract in females by the use of sulfanilamide alone.

It is the group of patients who have gonorrhea and who have failed to respond to the administration of this drug that we have continued to treat by means of artificial fever for the past year and a half.

Since there were a few patients who failed to respond to fever therapy but who responded promptly to sulfanilamide and, conversely, since there were a few patients who failed to respond to sulfanilamide but quickly showed negative cultures after the use of fever, we began to use sulfanilamide and fever therapy in combination. Our procedure now is to administer 80 grains of sulfanilamide daily for two days prior to the session of fever therapy and then administer the latter for ten hours at a bodily temperature of 106.7 F. (41.5 C.).

Since July, 1937, we have given treatment in 43 cases of gonorrhea by means of fever therapy and sulfanilamide combined. The average number of ten-hour sessions of fever necessary was 1.2 per patient. Two women required two long sessions before negative cultures were obtained. One man who had many complications was given five hours of fever therapy; then six hours of fever therapy; followed by resection of an epididymis, after which he still continued to have positive cultures for *Neisseria gonorrhoeae*. Repeated negative cultures were obtained, however, after two more sessions of fever, each lasting ten hours. Another man was given 3 ten-hour sessions for gonorrheal arthritis. Cultures were negative after the first ten-hour session, but commensurate improvement in the arthritis was not obtained. The arthritis finally was considered to be of the secondary, non-specific type.

In one case four negative cultures were obtained after 2 five-hour sessions of artificial fever. The treatments were discontinued at the end of five hours each time because the patient's pulse rate became extremely high and could not be reduced.

All of the women received vaginal diathermy during the entire period of each fever treatment or during half of the duration of each session. Two of the ten women treated required two long sessions before negative cultures were obtained. One woman, previously mentioned, aged 57 years, was given a five-hour session and then a six-hour session in combination with vaginal diathermy and obtained a complete remission.

Two of the forty-three patients failed to obtain negative cultures. One, a man who had had two negative cultures before dismissal, wrote us that he had experienced a recurrence a few days after reaching home. The other patient was a woman who continued to have positive cultures after the fever session and has remained in this state throughout repeated courses of sulfanilamide therapy. Both of these patients possibly could be listed as having had incomplete fever therapy because they received only one treatment each and because positive cultures did not occur in any case in which two or more treatments were given.

Ballenger reported that he had encountered only one failure among ten patients treated by a combination of sulfanilamide (80 grains a day for two days preceding fever therapy) and three-hour sessions of fever therapy at systemic temperatures of 103 or 104 F. (39.3 or 40 C.) given every other day for three sessions. Although we have not made an attempt to follow this procedure, we did give one individual 2 five-hour sessions at a bodily temperature of 106.7 F. (41.5 C.) and failed to obtain negative cultures,

although we did succeed with such a procedure in one of the aforementioned cases. It appears, however, that since there were two failures in forty-one cases in which ten-hour sessions were used, and since there were five of these cases in which two or more long sessions were required to eradicate the disease, the use of the short sessions of low fever in combination with sulfanilamide is not likely to prove successful in the face of resistant gonorrheal infection.

The percentage of failures in the treatment of gonorrheal infections by the use of various modifications of fever therapy has not changed a great deal. Desjardins, Stuhler and Popp reported in 1936 that between December, 1933, and August, 1935, they successfully treated seventy-six patients who had positive cultures "sixty-eight or 89.5 per cent of whom were cured, seven or 9.2 per cent were improved, and in only one patient did the infection prove rebellious." Of their group of seventy-six patients, three received ten or more sessions of fever of six hours each and the average number of treatments was 5.4.

In 1937, we studied a series of eighty-four patients who had positive cultures for *Neisseria gonorrhoeae* treated by means of ten-hour sessions of fever therapy. In 95.2 per cent negative cultures were obtained. The average number of treatments was 1.1. In 76 per cent of the cases negative cultures were obtained after a single ten-hour session of fever therapy.

The percentage of failures in the group of forty-three patients who failed to respond to sulfanilamide therapy alone and who received the combination of sulfanilamide and fever therapy was 4.6. The average number of treatments was 1.2.

It must be borne in mind that the patients who were given the combined chemothermotherapy apparently had extremely resistant gonorrheal infections. The patients who present themselves at the clinic because of gonorrheal infection are not representative of the general group of patients who have gonorrhea. The disease of many of these patients who come to the clinic either has proved resistant to treatment elsewhere or presents a complication difficult of eradication under the present technic.

Brucellosis

Since 1936, artificial fever therapy has been used at the clinic in a few cases of brucellosis. The number is small and we are fully cognizant of the sound statement that final conclusions should not be drawn as to the efficacy of any treatment of disease in human beings until at least 100 controlled cases have been observed. However, the results of treatment obtained in fifteen cases at the clinic, and in nine cases treated elsewhere* by artificial fever therapy indicate the value of this type of therapy. In our series, each patient was given three sessions of fever separated from one another by intervals of three days, maintaining at each session a sustained rectal temperature of 105 to 106 F. (40.6 to 41.1 C.) for five hours. This routine is arbitrary and the number of sessions, height of sustained fever and interval between treatments may be varied. The patient may be ambulatory if his condition permits, but for closer observation we prefer that he remain in the hospital during the entire course of treatment.

The mechanism and the effect of this type of treatment are not clearly understood. Thompson has shown conclusively that a sustained temperature of 107 F. (41.7 C.) for twenty-four hours does not kill the *Brucella abortus* in vitro. The explanation must lie in the activation or heightening of the intrinsic protective mechanism of the body.

* Droz, M. K.; Zeiter, W. J.; Simpson, W. M., and Solomon, W. M.: Personal communication to the authors.

Prickman⁹ has pointed out that the evaluation of results of any treatment of brucellosis is difficult and it should be remembered that the disease is self-limited and therefore the term "cure" should be avoided. The disease may last a few weeks or years; it may be debilitating and result in chronic invalidism with remissions and exacerbations. Angle emphasized the difficulty encountered in evaluating the results of any method of treatment of brucellosis and offered criteria as a basis for determining whether or not the patient has recovered from the disease. We have employed those criteria which are: (1) Disappearance of the subjective symptoms; (2) increase in weight; (3) gradual disappearance of the fever; (4) lowering of the agglutination titer of the blood; (5) return of the blood picture to normal and (6) subsidence of the neurologic symptoms.

Of the fifteen patients who had brucellosis infection whom we have treated, twelve, or 80 per cent, were greatly improved. The average duration of the disease was 3.5 months, varying between ten days and one year. The average number of treatments given was 4.4 and the average total number of hours of sustained bodily temperature at 105 F. (40.6 C.) was 14.4.

Chorea

A study of the results of treatment of chorea by artificial fever was made in twenty cases. Evaluation of these results was difficult because many of the patients did not remain under the care of the clinic immediately after fever therapy was employed and as yet a complete follow-up study has not been made. Of the twenty patients treated, eleven were females and nine were males. The average age was 11.7 years. In thirteen of the cases the severity of the disease prior to treatment was moderate; in five, marked and in two, very severe. Nine patients had carditis, seven were in the acute stage of chorea and thirteen were in the chronic stage.

Early in the use of fever therapy in the treatment of chorea, sessions lasting five or six hours with bodily temperatures maintained between 105 and 107 F. (40.6 and 41.7 C.) were administered every third day until three or four treatments had been given. More recently, the procedure used by Barnacle, Ewalt and Ebaugh has been followed. The patients were given ten or twelve daily sessions of fever for two and a half to three hours at bodily temperatures of 104 to 105 F. (40 to 40.6 C.). The average number of treatments was 5.5. Each session lasted four hours. Each patient, therefore, received an average of twenty-two hours with bodily temperatures maintained above 105.4 F. (40.8 C.). One patient received nine, two received ten and one received twelve treatments.

The results in the twenty cases studied showed that eight (40 per cent) were considered to have had complete clinical remissions; seven (35 per cent) had from slight to marked improvement but did not have complete subsidence of symptoms. Among those improved, at least two had recurrences; one, three months and one, eighteen months later. In one case (5 per cent) improvement did not occur. Three patients received two sessions of fever or less and were considered as having had incomplete treatment. One was a girl, aged 17, who had experienced a recurrence. Her condition improved after the first series of treatments, but she refused to take more than two treatments during the second series. One patient could not be managed in the cabinet. Another patient considered as having had incomplete treatment experienced symptoms of heat stroke with convulsions and pulmonary edema during the first session.

It is interesting to note that Osborne, Blatt and Neymann obtained their best results by maintaining the temperature of the body at 104 or 105 F.

(40 or 40.6 C.) for eight hours, administering three or four treatments. Barnacle, Ewalt and Ebaugh used on an average 12.5 treatments, given daily and each lasting two and a half to three hours with good results. In both of these series a total of between twenty-four and thirty-two hours of fever was applied. In our series the most spectacular results were obtained when the patients received between twenty-four and thirty hours of fever therapy.

Chronic Infectious Arthritis

In the past two years we have been using short sessions of fever therapy with elevations of bodily temperature to 101 or 102 F. (38.3 or 38.9 C.) in the treatment of chronic infectious arthritis. There has not been any attempt to evaluate the results of this treatment; however, it is felt that any elevation of bodily temperature, whether it is caused by a fever cabinet, hot bath, hot pack, fever pack or typhoid vaccine, tends to control the flare-up of the disease.

The method used in these cases varies. Some patients are given sessions of a half hour each in the fever cabinet elevating the bodily temperatures to 100 or 102 F. (37.8 or 38.9 C.) after which they are given massage and corrective exercises. This procedure may be repeated daily or every other day, using local heat, massage and exercises on alternate days. Another procedure is to place the patient in the Hubbard tank with the temperature of the water at 100 F. (37.8 C.) and gradually increasing it to 106 or 108 F. (41.1 or 42.2 C.). The patient is kept in the water twenty to thirty minutes, elevating his bodily temperature to 100 or 102 F. (37.8 or 38.9 C.). During the time the patient is in the tank he is given under-water massage and exercises. This treatment also may be repeated daily; however, we usually use a three-day routine of fever cabinet, Hubbard tank and local heating.

Summary

Our chief interest has been in the use of fever therapy in cases of gonorrhea. Most of our cases have been of this type. We have also been interested in the treatment of brucellosis, chorea and a few other diseases.

So far, we have been able to report our results for only three diseases (gonorrhea, brucellosis and chorea) and in the latter two instances we can give only preliminary reports.

It will be seen that in the treatment of these three types of cases we have been able to obtain a high percentage of apparent clinical improvements or remissions, for of 448 such cases in which we have prescribed fever therapy, 83.1 per cent have fallen in this category. It is believed that fever therapy will continue to serve as an important method of therapeutics.

Bibliography

1. Angle, F. E.: Treatment of Acute and Chronic Brucellosis (Undulant Fever); Personal Observation of One Hundred Cases Over a Period of Seven Years, *J. A. M. A.* **105**:939 (Sept. 21) 1935.
2. Ballenger, E. G.; Elder, O. F., and McDonald, H. P.: Sulfanilamide and Thermo-therapy in Gonococcal Infections; A Preliminary Report, *J. A. M. A.* **109**:1037 (Sept. 25) 1937.
3. Barnacle, C. H.; Ewalt, J. R., and Ebaugh, F. G.: Artificial Fever Treatment of Choreia; Preliminary Report, *J. A. M. A.* **106**:2046 (June 13) 1936.
4. Bierman, William, and Horowitz, E. A.: Gonococcal Infection in the Female Treated by Means of Combined Systemic and Additional Pelvic Heating, Abstract Papers and Discussions, Fifth Annual Fever Conference, Dayton, Ohio, May 2 and 3, 1935, pp. 30-31.

(Concluded on page 376)

INFRA-RED PHOTOGRAPHY IN THE DIAGNOSIS OF VASCULAR TUMORS *

F. RONCHESE, M.D.

PROVIDENCE, RHODE ISLAND

Infra-red photography is about six or seven years old and recently has been widely used in medicine and in the study of minerals, chemicals, body fluids, insects, and the like.

In medicine, and particularly in dermatology, it is an interesting method. An infra-red plate gives a peculiar appearance, very different from an ordinary photographic film, to the normal and pathologic skin (fig. 1) and to a



Fig. 1.—Striking difference between the appearance of an ordinary photograph, *A*, and the one obtained with an infra-red plate, *B*. Lipstick, fingernail polish, pimples and freckles are completely ignored.

gross and microscopic pathologic specimen.

At the beginning this work appeared to be only of scientific interest. Later on, it revealed a remarkable practical value. The visibility of hidden

* Dermatologist, Rhode Island Hospital and C. V. Chapin Hospital, Providence, Rhode Island.

* Read at the Seventeenth Annual Session of the American Congress of Physical Therapy, Chicago, September 13, 1938.

varicose veins of the lower extremities directs their treatment. Invisible veins at the bend of the elbow, very annoying when repeated intravenous injections are to be administered, often can be "shadowed" by this method and intravenous therapy carried out much easier. Internal venous obstructions can be properly located by the superficial venous net, not visible in an ordinary film, but well outlined in an infra-red plate. Vascular growths (cavernous hemangiomas) hidden under a normal skin, only noticeable as a bulging mass or not at all, are correctly diagnosed by the peculiar shadow on an infra-red plate (figs. 2, 3). In such cases it is possible to make a

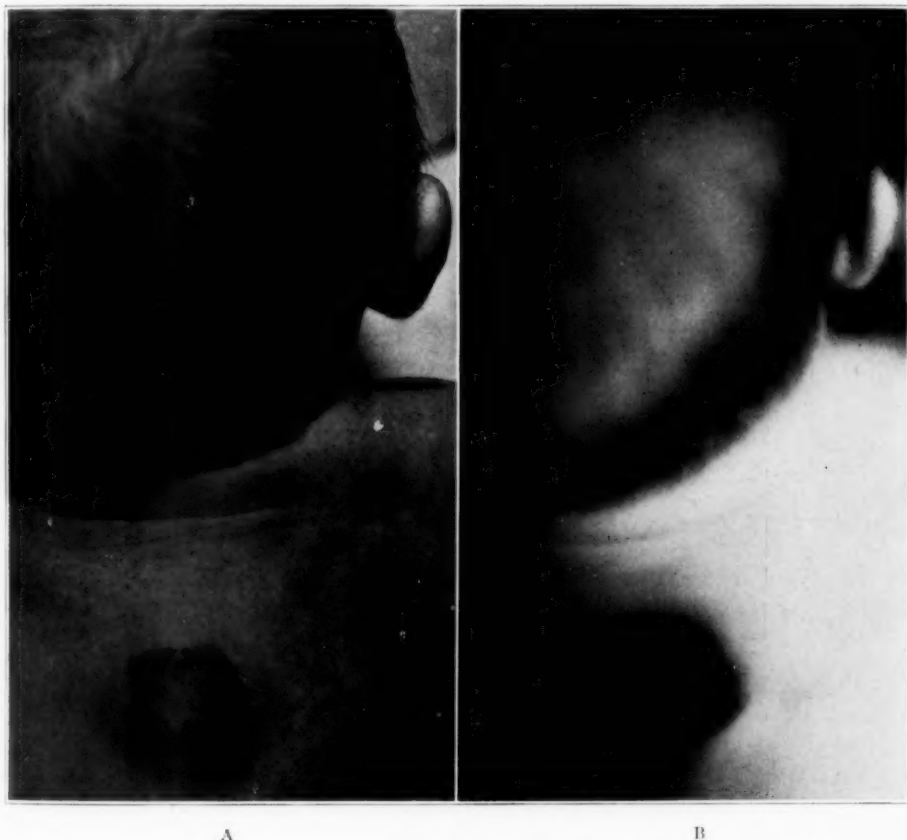


Fig. 2. — *A*, ordinary; *B*, infra-red. Back of a six months old baby. A cavernous hemangioma hidden under the normal skin is revealed in the infra-red plate with a heavy shadow, which is a positive proof of the presence of free blood.

differentiation between the content of a cystic tumor, viz., to rule out or to ascertain, the presence of free blood, so that a soft, fluctuating tumor can be diagnosed as an hemangioma to the exclusion of other fluid containing growths.

For example, one may be confronted with a tumor which is covered by normal skin, which shows no bluish discoloration visible on exertion or provoked local congestion or is not surrounded by branching veins (figs. 3, 4). On transillumination the content may or may not cast a shadow. Palpation of the tumor will not reveal the nature of the fluid. The diagnoses of hemangioma, hemolymphangioma, lymphoma, cyst, lipoma, meningocele, have equal chance to be right or wrong.

These are precisely the cases in which infra-red photography is a great



Fig. 3. — *A*, ordinary; *B*, infra-red. Tumor behind the ear completely covered by normal skin. The diagnosis rested between lipoma, cyst, lymphangioma, hemangioma. The shadow in the infra-red plate proved the tumor to be an hemangioma.

help in solving the diagnostic problem. In the absence of blood no shadow is visible in the infra-red plate (fig. 4).



Fig. 4. — *A*, ordinary; *B*, infra-red. Synovial cysts. A cystic tumor containing clear fluid casts no shadow in the infra-red plate. It demonstrates absence of blood within the tumor.

Of course, a deep seated collection of blood will not show in the plate. It must be located immediately under the skin.

Accordingly, infra-red photography is not only an interesting scientific procedure but a practical one, an addition to our diagnostic armamentarium.

The equipment needed to take an infra-red photograph is an ordinary clinical camera. On the lens is placed a special filter which will absorb all the violet and blue light. As a source of illumination an incandescent tungsten filament lamp or a photoflood lamp can be used. At a distance of about 3 feet, with the diaphragm at $f:22$, and at an exposure of about 3 to 5 seconds, a satisfactory plate should be obtained. The plates must be handled with special care. Some holders used in ordinary photography are not suited for infra-red. The plates must be handled and developed in complete darkness.

The fact that a time exposure is needed is a handicap when the subject is a crying, restless baby. The exposure must be repeated until successful, or general anesthesia must be used.

Further details of technic can be found in the paper of Massopust¹ and references in my previous paper on the subject.²

Summary

Infra-red photography is an interesting photographic method in scientific investigations.

It is of practical diagnostic value in the determination of hidden varicose veins, in cases of internal obstructions in cases of small veins at the bend of the elbow, in the diagnosis of hidden subcutaneous vascular tumors (doubtful cavernous hemangiomas).

122 Waterman Street.

References

1. Massopust, L. C.: *Infra-red Photography, Radiography & Clin. Photography* 10:2, 1934.
2. Ronchese, F.: *Infra-red Photography in the Diagnosis of Vascular Tumors*, *Am. J. Surg.* 37:475, 1937.

GASTRO-INTESTINAL THERAPY IN ATROPHIC ARTHRITIS *

E. GOLDFAIN, M.D.

OKLAHOMA CITY

Atrophic arthritis is a general constitutional disease in which every system of the body suffers directly or indirectly. The gastro-intestinal tract is no exception. Its involvement may be manifest in the way of dysfunction of any or all of its various parts. It is not within the confines of this paper to delineate the various physiologic disturbances that may occur in the stomach or large bowel, only measures applied to establish normal function of the digestive system being set forth.

It is essential to recall certain requirements to insure proper function of the gastro-intestinal tract. These are: (1) A proper food supply; (2) good intestinal drainage; (3) keeping the physiologic load imposed on the alimentary tract within its ability to control without embarrassment.

In respect to the food supply, some requirements are that it contain properly balanced proportions to each other of proteins, fats, and carbohydrates. Minerals, especially calcium, phosphorus, and iron, should be present in amounts adequate for the needs of the body. Vitamins need be present in adequate amounts. The ketogenic-antiketogenic ratio should not be out of proportion. The following diet answers these requirements:

During each twenty-four hour period the patient should have a quart of milk, three slices of whole wheat bread, at least two eggs, two or three different types of green vegetables as well as two cooked vegetables; adequate amount of fruit juices and two fresh, raw fruits; meat, fish, or fowl once a day; bacon at breakfast time, two strips; and butter in moderate amounts. He should have various soups and salad dressings. He should drink at least three glasses of water between meals in addition to the fluids taken at meal time. The portions of vegetables should be of average quantity.

The patient should eliminate from his dietary jellies, jams, pies, cakes, candies, spices, condiments, chili, or any other type of similar foods, or any food which is highly rich or greasy.

* Read at the Seventeenth Annual Session of the American Congress of Physical Therapy, Chicago, September 13, 1938.

This diet, when properly analyzed, is found to yield a sufficient amount of vitamins, except vitamin D. It also affords a proper supply of calcium, phosphorus, and iron. The ketogenic-antiketogenic ratio is not more than 1:2. The value of this diet is close to 2000 calories. Caloric value can be increased by adding a few food articles when and where necessary. I often recommend to my patients to take about three times a week an average serving of Pabulum together with a moderate amount of cream and sugar. This helps increase the iron and vitamin content of the diet in general. Corn-bread in the amount of two slices 4 by 5 by 7 inches in place of the whole wheat bread may be substituted at times. It has a caloric value slightly above that of whole wheat bread. The bulk in this dietary is only of moderate amount, yet sufficient to aid elimination. An important consideration of this diet is that the carbohydrate proportion is low. Carbohydrate type of food when out of proportion to proteins and fats, because of its bulk puts an extra physical load upon the weak gastro-intestinal tract. This diet avoids this objection. It has been shown in original work¹ that a reduction in the total carbohydrate intake as compared to proteins and fats also is of value in reducing the total growth of streptococci in stools and in increasing the absorption of vitamins from the intestinal tract.

Intestinal Drainage

The second general requirement; namely, good intestinal drainage, is in our opinion of paramount importance. If the bowels, especially the colon, are to function adequately, the amount and type of food that is ingested must be such as to avoid excessive burden on the intestinal tract. Observations made in respect to diet and the above-mentioned carbohydrate-containing foods apply with regard to the bowels in a marked degree. That is to say, if the bulk of ingested food does not overload the intestinal tract, then the colon will automatically function more effectively. The intestinal muscular system in patients suffering from arthritis shares in the general muscular asthenia. To attain good intestinal drainage in arthritis, it is therefore important to reduce the total food intake to that point where it does not overtax the weakened muscular system of the small and large bowel.

There is to be taken into account the matter of habit time. Organs in general work best when habituated to a certain rhythm in their function. Establishment of a habit time tends to aid regularity of elimination. At times additional measures are necessary. These can be in the form of colonic irrigations, an enema, or substances taken by mouth which have no irritant effect upon the mucosa and yet act to cause a rather natural but soft-formed movement. A laxative mixture that patients may prepare and take regularly, and which works admirably in that it produces one and occasionally two soft but rather formed bowel eliminations each day, is the following:

Boil one quart of water and cool.

Take juice of four lemons, two tablespoons sugar, one teaspoon cream of tartar, two tablespoons Epsom salts. Heat these but do not boil. Then add to cool water and stir.

Dose one-half glass (or four ounces) at bedtime.

A means of reducing quantitative infection within the colon, thereby also reducing systemic absorption of toxic and putrefactive products, is a permanganate of potassium enema. It has been recommended by H. W. Nott.² In my experience it has proved of value. The medicated enemas are administered at least three times a week for about three weeks, twice a week for another five weeks, and once a week thereafter until a course of at least thirty has been taken. The patient can be instructed in the matter of

self administration. They are relatively inexpensive. Instructions as to their administration are as follows:

A one-grain tablet of potassium permanganate is dissolved in a glassful of cool water. The resulting solution should then be added to a pint and a half of warm water and the total quart of solution used as an enema at any time of day that it is most convenient for the patient. He is to lie on his left side with the nozzle of the enema tube properly inserted and allow approximately one-third to one-half of the solution to enter the bowel. The enema bag should be held about a foot to a foot and a half above the body. Then the flow is shut off, the patient turns on his back, remains in that position for about a minute, and then allows the rest of the solution to flow into the bowel. He should try to retain this solution in the bowel for about five to fifteen minutes, turning on his right side for a few minutes.

Such procedures for causing better intestinal drainage have proved quite useful. They reduce the number of cases requiring colonic lavage. However there are patients for whom colonic irrigation is indicated.

Proper functioning of the intestinal tract is also aided by administration of fairly large doses of vitamin B complex containing both vitamin B and G, and of moderately large sized doses of vitamin D. The vitamin B complex especially seems to act favorably upon the nerve supply to the gastrointestinal tract and upon the general intestinal muscle tone. It tends to produce a more normal anatomic configuration of the various parts of the colon.

Careful instruction of the patient about indirect rest periods for the digestive system is of value. By that is meant the matter of avoiding fatigue. General fatigue, whether caused by mental factors or by excessive physical indulgence of one type or another or by both, has a debilitating effect upon the body as a whole. In that way it indirectly harms the intestinal tract. It is therefore recommended to each patient that he is to observe periods of rest even as is prescribed for cases of tuberculosis. Rest periods should be taken in the morning as well as in the afternoon of one or two hours at a time. At least eight to ten hours of rest in bed at night is advisable. Between these periods of physical and mental rest patients are allowed to indulge in physical and mental exertion to the extent they are able to perform without fatigue.

References

1. Pemberton, Ralph, and Osgood, Robt. B.: *The Medical and Orthopaedic Management of Chronic Arthritis*, New York, The Macmillan Company, 1934.
2. Nott, Herbert W.: *The Thyroid and Manganese Treatment*, London, William Heinemann (Medical Books) Ltd., 1931.

Bibliography

1. Cowgill, G. R.; Rosenberg, H. A., and Rogoff, J.: *Studies in the Physiology of Vitamins: XVI. The Effect of Exercise on the Time Required for the Development of the Anorexia Characteristic of Lack of Undifferentiated Vitamin B.*, *Am. J. Physiol.* **98**:589 (Nov.) 1931.
2. Cruickshank, John: *The Bacterial Flora of the Intestine in Health and in Chronic Disease*, *British Med. J.* **2**:555 (Sept. 29) 1928.
3. Fletcher, A. A., and Graham, Duncan: *The Large Bowel in Chronic Arthritis*, *Am. J. Med. Sci.* **179**:91 (Jan.) 1930; Also *Tr. A. Am. Physicians*, **44**:231 (1929).
4. Himwich, H. E.; Goldfarb, W., and Cowgill, G. R.: *Studies in the Physiology of Vitamins: The Effect of Thyroid Administration Upon the Anorexia Characteristic of Lack of Undifferentiated Vitamin B.*, *Am. J. Physiol.* **99**:689 (Feb.) 1931.
5. Kruse, H. D., and McCollum, E. V.: *Review of Recent Studies on the Anti-neuritic Vitamin*, *J. A. M. A.* **98**:2201 (June 18) 1932.
6. Pemberton, Ralph: *Arthritis and Rheumatoid Conditions: Their Nature and Treatment*, Philadelphia, Lea & Febiger, 1930, p. 312.
7. Pemberton, Ralph, and Peirce, E. G.: *The Relation of the Intestinal Tract and Diet to the Treatment of Arthritis*, *Ann. Int. Med.* **5**:1221 (April) 1932.

Discussion

Dr. Eugene F. Traut (Chicago): The importance Dr. Goldfain attaches to the gastro-intestinal system in arthritis is indeed not exaggerated. Whether the dysfunctions so frequently observed in these organs are manifestations of individual allergy, the secondary result of generalized change, or a contributing factor in the pathologic condition, cannot be readily determined. Certain it is that as long as the intestinal mucosa is not in a normal state that long will it fail properly to absorb the desirable components of an excellent diet such as Dr. Goldfain describes.

In a recent study of the intestinal flora in chronic arthritis we found a very high percentage of patients harboring abnormal organisms, such as hemolytic bacillus coli, hemolytic staphylococci, and hemolytic and greening streptococci. These occurred without relation to complaints of diarrhea, constipation or abdominal pain. Frequently the percentage of these organisms was found to be increased coincidentally with exacerbations of arthritis, or even to usher such episodes. Although Pemberton reports no significant change in the intestinal flora after improvement in the arthritic symptoms has been established, we feel that it is highly desirable to restore normal flora if at all possible.

Quite true, a low carbohydrate diet helps to keep the percentage of streptococci at a lower level. Medicated enemas also will reduce the number of these organisms for a time. Introduction of large numbers of lactic acid bacilli will

temporarily overgrow the pathogenic forms. Colonic lavage has had its chance. But while all these maneuvers may bring varying degrees of improvement, it is only temporary. If later periodic cultures are taken, it will be found that the original organisms tend to return and flourish as before.

The one means we have found that will permanently remove the streptococci and hemolytic bacilli coli is sulfanilimide or its related products. Neo-prontosil (Winthrop) has been the most satisfactory because its low toxicity lends itself to fairly long periods of treatment. There are only a very few patients who do not tolerate this drug because of its irritating effect on the intestinal mucosa. In none has there been a leukopenia or marked anemia. Patients have been kept on neo-prontosil for as long as eight weeks. Patients with arthritis require a longer period for bacterial change than any other group. But if they are treated consistently and cultured frequently one sees the percentage of abnormal streptococci become less and the zone of hemolysis around the coli colonies steadily grow smaller. In the rest periods there is some regression, and in a few patients it has been necessary to use autogenous vaccine as an adjunct where they could not be observed over a sufficiently long period.

The intelligent routine Dr. Goldfain suggests, coupled with chemotherapy, renders control of the gastro-intestinal system more than a possibility.



THE PSYCHOLOGIC IMPORTANCE OF PLAY IN A CHILDREN'S HOSPITAL *

ANNE M. SMITH, O.T.

CHICAGO

Revaluation of aims, methods, and results to determine what is constructive and vital in the light of present knowledge of children seems characteristic of our times. It affects particularly all agencies dealing with children. With the attention of whole nations directed, since the World War, toward the best conservation and care of children, hospitals, along with other institutions are carrying on searching analysis. They, too, have a share in fulfilling at least two of the points of the White House Conference of 1930 embodied in the Children's Charter:

For every child, understanding and the guarding of his personality as his most precious right.

For every child from birth through adolescence, promotion of health, including health instruction and a health program, wholesome physical and mental recreation, with teachers and leaders adequately trained.

In the light of scientific findings of the past thirty years, no modern, progressive administrators of children's hospitals can accept the view that they have discharged their entire duty when the physical condition of their patients is treated expertly.

One fact that scientific research has revealed is, that the physical, mental, and emotional aspects of human beings are inextricably mingled. In the medical field the fact is recognized that a large per cent of patients have no organic disease, and that disease may be an expression of emotional disturbance. Various estimates have been given by authorities, who state that from 33 to 85 per cent of their patients have no organic disease.

Elizabeth Lee Vincent claims that the fact that sick children are more susceptible than well children is well established in psychology.

It takes less pain to make them feel it, less fear to make them terrorized, less security to make them afraid.† She points out that the emergency conditions under which a very large proportion of the children are brought into a hospital cause an acute emotional conditioning. Impressions are vivid and "remain more permanently in their personal and physiological equipment than ordinary experiences."

The child is deeply impressed by his first realization that there are such facts as serious illness and death. Surrounded by the sick and suffering, the cumulative effect of envisioning large hospitals filled with the very sick may be overpowering to the sensitive child and show lasting psychologic results. If morbid influences affect the nervous system more energetically during the period of a child's most rapid growth than during adolescence, how important is it in the child's first realization that shock be avoided, that suffering be alleviated, and that he be given the experiences of and placed in an environment conducive to cheerfulness and courage in facing what has to be met.

Adler claims that all illness is a "dangerous corner" psychologically, but that illnesses "can be made much less dangerous by developing the attitude of courage and social-mindedness." He claims "a child is psychologically

* Read at the Joint Meeting of the Seventeenth Annual Session of the American Congress of Physical Therapy, and the Twenty-Second Annual Meeting of the American Occupational Therapy Association, Chicago, September 14, 1938.

† Elizabeth Lee Vincent, *The Human Side of a Children's Hospital*, Hospitals, January, 1937.

affected by illness only in so far as he is not social-minded." (Alfred Adler, *The Education of Children*, p. 192.)

Group play can be an invaluable aid in preventing neurotic tendencies from gaining headway during childhood illnesses. It counteracts tendencies toward dependence, toward fixation of habits of invalidism which purely medical and rest treatments tend to create and to perpetuate. Engrossed in play, the child has less reason and opportunity to cultivate grudges against people and conditions. His attention is directed away from himself to co-operative participation in meaningful activities of an absorbing and joyous nature.

In several hospitals group play has been found practical and effective in producing an environment more compatible to childhood. It has been used successfully to allay children's fears on admission to the hospital and before operations as well as in the daily care on the wards. The Children's Memorial Hospital in Chicago has been a pioneer in promoting a full-time program under the direction of a play specialist employed as a regular member of the staff. Here, since 1932, play is an integral part of the care of sick children, and considered essential for their development, excepting of course the very sick and the babies. It is considered essential also for the development of the nurses. Every nurse who receives her pediatric training here is given regular class instruction in the technic of play as a fundamental part of her education in dealing with children. It is used as one of the easiest methods of approach in parent relations and parent education. Volunteers who expect to play with the children are required to attend classes in play before going on the wards. Members of the nursing staff were given classes in play not only for facilitating an approach to children because of better understanding of their needs but also because play releases tension and promotes harmony in hospital relationships.

Conditions Children Face

Children are subject to many trying experiences even in the best regulated hospitals. Because conditions are so foreign to their background, their inexperience produces strange fancies and many fear they are to be punished. Children seem particularly susceptible to tension and hurry. Even children brought in for a day, display homesickness, distrust, and fear in varying degrees. Many children were observed to have little time sense. This intensified their fears that their parents had forgotten them completely.

Confined to their beds for days, months, and sometimes years, like so many animals in a zoo, when every impulse drives the normal child not acutely ill to want to leap and run and jump, to use all of his body, all his senses for thinking and learning, wanting comrades in his constantly varying activities, they are now held down to routine quiet, and even to isolation at times. Is it any wonder that behavior problems arise where no program of play is provided that seem so vital to the children, or that little faces grow wan and listless and tempers snap when adult domination compels them to remain quiet?

The prevalence of behavior problems was the original cause for starting the program of play at The Children's Memorial Hospital. The hospital administrators felt that something more in keeping with child nature was needed to improve conditions. For the very sick children excellent medical and nursing care was sufficient. It was the children in the various stages of convalescence that demanded much attention to social needs as well as physical care from the nurses. It was difficult to determine which were normal needs and which were merely the reactions of the children to the hospital environment which concentrates on medical and physical care.

When given no interesting activities to counteract such reactions, the children had very little to think about except themselves and their illnesses. Great prevalence of masturbation by the children in the wards was one evidence of the need for providing activities interesting and absorbing to the children.

The nurses were kept busy trying to meet the demands of situations involving psychologic and social behavior as well as physical care. To children with fractures who were not really ill, to convalescents nearly well enough to be dismissed, to diabetics in the milder stages of the disease, and to many with orthopedic affections, confinement in bed appeared highly irksome imprisonment. In addition to physical limitations, there was a sense of being different from other children, a feeling of inferiority, very strong in some, particularly the crippled, the cardiacs, and the tuberculous.

Since conditions and problems like these are common to many children's hospitals, this larger viewpoint of the children's needs shows how inadequate are the usual methods of depending upon volunteers or on some part-time worker partially trained, to carry on play in a hospital. If an environment more suitable to children is to be provided, if children are not to be retarded mentally, socially, or physically by a long illness, a professionally educated play leader skilled in dealing with children of all ages can be of great service. Next to playing with the children and providing a correlated program of play, her greatest service consists in educating nurses, volunteers, and parents in using play constructively. This is done through regular classes in play, through demonstrations and conferences.

Responsibility for making the children happy and contented and forgetful of their fears rests on the whole nursing staff of The Children's Memorial Hospital. No morning or afternoon care is considered complete that does not provide for play in one of its many forms. Nurses are encouraged to play with the children while giving routine physical care whenever time permits, to sing with them, give them riddles and finger plays, folk and sense games, and to provide toys, books, or construction materials before leaving the room. In the earlier evening hours they are expected to give the quieter types of play without equipment. These, experience has shown actually expedite routine care because of the children's readiness to co-operate with the nurse who plays with them if only for a few minutes at a time.

Group Activities

Group activities are specially emphasized because group experiences counteract the inevitable isolation due to long periods of hospital care which many children must have, and because of the joy children experience in playing with others. To be kept strictly separate in beds is an ordeal adults do not seem to appreciate. Normal children are highly social beings. Unless acutely ill they need each other and show great sensitivity to aloofness and isolation whether it be physical or psychic. Children respond heartily and enthusiastically to the traditional folk games and to other group games. These, together with story telling, story acting, and group singing proved to be potent factors in keeping children emotionally stable and happy. Particularly interesting was the enthusiasm shown for dramatic play and folk games, the latter usually played by skipping in a circle. Their imaginations filled in the activities which frames, splints, and other confining apparatus prevented their bodies from performing.

In wards where children were separated in cubicles, where they were for precaution, or in restraints, group feeling was promoted by using play requiring no equipment. There was little danger of contagion where one used no material equipment. Such group play restored the feeling to the children

that they were doing the sort of thing normal children were engaged in, while precaution and isolation tended to create a sense of inferiority, of becoming social untouchables. Games, even very simple ones, were liked particularly, probably because their social qualities created a feeling of gayety, of unity, which overcame the physical barriers placed on or about them. They played these games over and over ~~with~~ great satisfaction. Stories, songs, finger plays, acting plays, acting out characters in pantomime and having the others name what was acted were easy to use under the restrictions.

Nurses know the value of play in taking care of children. They can be taught to use play effectively even in the short period of their affiliate training. The following are excerpts from two nurses' papers:

One wrote:

Group play lends harmony to the wards and instills friendliness in antagonistic groups. Ward 2 harbored eight fussy, irritable girls, four of them chorea patients. On this particular day I was unable to get any one of them to speak politely to another. After half an hour I decided to do something. I began with 'I see something so big and so tall.' Within five minutes Ward 2 was the quietest and most harmonious on the floor.

Another wrote:

A successful, uncomplicated convalescence is dependent upon well-directed play. The orthopedic ward here is an example. Their happiness and contentment in remaining for long periods of time is almost entirely due to their satisfactory play. Whether they be in casts, braces, flat on their backs, or limping about, the type of play they can participate in is brought to them. Otherwise we would have fretful, discontented youngsters feeling left out of everything. After all, play is of primary importance to them. They eat well because they are emotionally satisfied. Behavior problems are at a minimum because they have a substitute to occupy their minds. Even the sick child is eager for play and perks up with interest. Many people think play is only for the well child and the sick one is prevented from enjoying what his instinct craves. He is the child who develops into a behavior problem. I notice in hospitals without play departments, youngsters will be restless far into the night when they should be asleep. With a day filled with adequate play the hospitalized child is pleasantly fatigued and ready for a night's rest at an early hour. Better co-operation is secured from the child who is 'play satisfied' and the nurse's work is facilitated.

Education by means of play restores that unity of mind and body which formal teaching methods tend to disrupt. Play appears to be the method more natural for the child. So many of the most vital experiences are below word level, expressible only in action and feeling. Play's appeal to emotional depths in the child's nature and to their expression on an unverbalizable level renders easier the awakening of self-expression and the furthering of the child's emotional and social growth. The play leader acts as an awakener to constructive self-expression instead of serving as a restrictive control. Play offers a challenge within the child's comprehension and ability. Awareness, encouragement, and provision for the child's fumbling efforts is not dictation by an adult leader. The leader's part is to provide normalizing experiences in play to offset the environmental influences that tend to make children in hospitals abnormally sensitive, uncertain of themselves, insecure, and to develop their social relationships so that they are not retarded when returned to their communities.

At The Children's Memorial Hospital opportunities for discovering latent abilities, for expressing a variety of interests, and for acquiring new insights and skill were given the children in the form of play. Besides occupying themselves with games, stories, songs, and puzzles, they filled in many hours acting out stories based on home, hospital, and community life. They constructed things with building sets, tried their creative skill in modeling, drawing, painting or paper cutting. They knit, crocheted, did needlepoint,

(Concluded on page 372)

ARCHIVES of PHYSICAL THERAPY

OFFICIAL PUBLICATION AMERICAN CONGRESS OF PHYSICAL THERAPY

.. EDITORIALS ..

REGIMENTATION OF SHORT WAVE DIATHERMY

Any statement or report made by such an authoritative body as the Council on Physical Therapy of our American Medical Association has always been accepted as worthy of serious consideration, because of its unbiased decisions based on careful and exacting investigation. There is no question that the past labors of the Council have proved extremely informative and useful to the profession. Accordingly this body has come to be respected and depended upon as a bulwark against fallacies and dishonest pretensions no matter from what source. This body has maintained a policy in keeping with that carried out by the Association itself of presenting destructive criticism for the common weal and constructive guidance in the interest of science and truth in physical medicine. Under the circumstance a recent survey on medical diathermy¹ containing assertions of a moot nature has aroused considerable sentiment pro and contra because of an apparent regimentation of short wave diathermy in a rather dictatorial fashion. It would seem that the principal, objectionable feature is contained in the expressed dictum that there is no essential difference between diathermy of 300 meter wave length and short wave diathermy between 30 and 3 meters. To this should be added that in the same survey there is presented a list of indications with therapeutic suggestions which in some respects at least convey an impression of empiricism and this at a time when it is generally assumed that physical medicine is aiming for a goal of scientific precision.

In this connection one recalls that since the advent and clinical demonstration of the effects of short wave diathermy there have been advanced by a large number of physicists and physiologists claims which justified the assumption that as compared with classic diathermy the physiologic and therapeutic properties of short wave diathermy were such as to place this type in a class by itself and as vastly superior in many respects to the former. Ingenious experiments by many authors which have been critically reviewed by Rajewsky² have led to theories that short wave diathermy possesses distinctive biologic properties greatly at variance with those of conventional diathermy. While there was at no time a question that the clinical value of the high frequency current within the region of 300 meters is ascribable to thermoelectric effects on the basis of tissue conductivity and resistance, additional qualities were advanced for the high frequency current in ranges between 3 and 30 meters. The term selectivity was given to the idea that a change of wavelength between these two extremes produced selective effects on certain microstructures, and this claim was developed to indicate that variations in cellular structure could be controlled by definite and special wavelengths. Much of this has been disputed by a goodly number of physicists and physiologists who nevertheless have admitted that this problem cannot be easily disposed of without considerable additional experimental work of a complicated nature. Even the most conservative among them have reached the conclusion that short waves at diverse lengths exert various effects on the fluids contained within cells and this in spite of the surrounding insulated membranes in contrast to classic diathermy which lacks this biophysical quality.

This in part explains the difference in the technic of short wave therapy with particular reference to size and application of the electrodes, intensity of the field and duration of individual treatments. To this should be added that osseous structures can be physiologically heated by thermic radiation with short waves while classic diathermy and other forms of heating agents are unable to overcome their resistance. Under the circumstances it is rather premature for any one man or body of men to promulgate the pronouncement that there is virtually no difference between these two types of diathermy and that both have no other than thermotherapeutic value. If this idea were to be accepted unconditionally, the production of modern short wave apparatus has been useless except for affording greater technical convenience. It is but natural that when such an authoritative body as the Council on Physical Therapy undertakes to dispose of the whole problem, which has engaged the minds of eminent scientists for the past decade without having reached any definite results of their prolonged and exacting labors and research, there must arise in the minds of clinicians interested or specializing in physical therapy a state of confusion from which they must be freed at the earliest possible moment.

In the survey under discussion there is among others the indication for the treatment of bursitis from which we quote the following direction. "For acute bursitis infra-red radiation from a luminous source is given for 30 minutes at least daily and short wave diathermy is applied for 20 minutes once daily." Here the question at once suggests itself why it is necessary to select two such widely different modalities. It would seem that if infra-red therapy is effective then it should be given three times daily and not substituted by a period of short wave radiation. Or else short wave radiation is the more effective of the two and then instead of interposing it between the two periods it no doubt would be preferable to make sole use of it as often as is physiologically indicated. If convenience is the factor considered, then it would seem preferable to omit both infra-red and short wave radiation and resort to simple hydrotherapeutic measures in the form of hot cataplasms. This situation exemplifies in the physical field what pharmacotherapy has fought against for years; namely, polypharmacy. Just as one prescribes a remedy for a definite objective because of its definite effects without temporizing with substitutes, so in physical therapy the available agents must be applied according to physiologic principles except for synergistic action. The average practitioner cannot but be bewildered by such dogmatic empiricism and recall the historic period when decoctions of dozens of herbs were brewed together in one dose with the expectation that perhaps one of the ingredients might assume the role of a mysterious therapeutic benefactor.

The survey of the Council unquestionably manifests an admirable zeal to be useful as a guide to the average practitioner both in proper selection of clinical material and the rational application of suitable therapeutic agents. Indeed, this survey would have been invaluable had attention been paid to the very physiologic properties and characteristics of short wave as compared to classic diathermy. Unfortunately there has been a complete failure to even discuss the established fact that from the standpoint of a difference between the former and the latter the dielectric constant of the tissues and their conductivity are not independent of frequency or wavelength. It is definitely established that increased frequency augments tissue conductivity and decreases the dielectric constant. This fact has been firmly established not only by laboratory experiments with varying and different electrolytic solutions but by actual studies of the living organisms which clearly

revealed the behavior of the blood cells in a high frequency field produced by diverse wavelengths. It must suffice here to present the entire and complicated problem by the terse statement that the blood cells are surrounded by a membrane of low conductivity while the plasma in the cells is endowed with a greater current conductivity. A conventional diathermy current can exert only a relatively weak effect on the cells precisely because of these differences between the membrane and the plasma, while short wave diathermy at proper dosage both in intensity and time facilitates a thermal exchange between the two because of its greater effectiveness on the membrane surrounding the plasma. That such an effect must necessarily produce vastly greater physiologic effects in cellular life requires no argument.

For the present these observations must suffice to show that the Council has been rather premature in its dictum with regard to short wave in relation to conventional diathermy. A danger in such a dictum lies in the possible stifling of further initiative in research when precisely an authoritative body like our Council should be the very one to encourage both laboratory and clinical research with a view of either substantiating or disproving the results reported by the reliable workers in this field. Such an attitude would be particularly propitious at this moment when the claim by the Council that dosage in short wave diathermy can be regulated only according to individual sensitivity no longer applies because of the presentation of an instrument which permits direct reading of an administered dose with the simplicity one obtains in metric scales.^{3, 4} This, too, is a factor which should by this time have received greater informative consideration in that survey. From what has been said there can be no question of the fact that there is a vast difference between short wave and conventional diathermy, and while the last word on this problem has yet to be spoken, sufficient evidence has been produced to justify further investigation in order to prevent empiric regimentation of any of the agents used in physical medicine.

References

1. Medical Diathermy, J. A. M. A. **112**:2046 (May 20) 1939.
2. Rajewsky, B.: *Ergebnisse der Biophysikalischen Forschung*, Leipzig, Georg Thieme Verlag, 1938.
3. Mittelmann, Eugen, and Kobak, Disraeli: Dosage Measurement in Short Wave Diathermy, *Arch. Phys. Therap.* **19**:725 (Dec.) 1938.
4. Kowarschik, J.: The Measurement of Dosage in Short Wave Therapy, *Arch. Phys. Therap.* **20**:208 (April) 1939.

SOUTHEASTERN SECTION

MEETING TO BE HELD JULY 10

AT GEORGE WASHINGTON HOTEL

JACKSONVILLE, FLORIDA

The organization of the Southeastern Section of the American Congress of Physical Therapy will be marked by its first annual scientific meeting, on July 10, at Jacksonville, Florida. Interest in physical therapy in the southeastern states has gradually increased during the past few years, and the scientific program which has been arranged should be highly appreciated. The meeting will also have an important influence on the public, since many people in certain parts of the country are unfamiliar with the fact that physical therapy is an ethical branch of medicine.

The program appears elsewhere in this issue. Those who can give up the time to hear diversified papers such as these, will benefit greatly by the

information they will impart. Physicians can no longer disregard physical therapy when indicated. With only a few opportunities of acquiring correct knowledge of the subject, a sectional gathering such as this one should prove especially profitable. The problem of traveling long distances is eliminated by bringing the meeting to a city easily reached from various points by short travel.

Jacksonville is ideally situated from a geographical point of view. It is one of the leading industrial cities of Florida, and, in reality, the gateway to the state. It has a large group of physicians, progressive and far-seeing, who undoubtedly know and will appreciate a session devoted exclusively to physical medicine.

To those who worked so zealously for the organization of this Southeastern Section, the Congress owes a debt of gratitude. If similar groups could be started in other parts of the country where education in the newer science is so greatly needed, the Congress as well as the general medical profession would benefit greatly. We sincerely hope that the attendance at the July tenth meeting in Jacksonville will justify the efforts of those who sponsor this undertaking.

Status of Transurethral Prostatic Resection — Myers

(Continued from page 345)

References

1. Kretschmer, Herman L.: Diseases of Prostate in Practice of Surgery, Dean Lewis, Hagerstown, Md., W. F. Prior Co., Inc., 1932.
2. Davis, Theodore M.: Transurethral Prostatic Resection With Report of 748 Cases, Southern M. J. **28**:693 (Aug.) 1935.
3. Engel, W. J.: Personal Communication, (Aug.) 1936.
4. Thompson, Greshom J.: Recurrences of Urinary Obstruction Following Transurethral Prostatic Resection, J. Urol. **34**:405 (Nov.) 1935.
5. Ballenger, Edgar G., Elder, Omar F., and McDonald, Harold P.: Transurethral Resection of the Prostate Gland. Report of 125 Cases, J. M. A. Georgia **23**:60 (Feb.) 1934.
6. Bugbee, Henry G.: Prostatic Problem — Present Status, New York State J. Med. **36**:102 (Jan. 15) 1936.
7. Collings, C. W.: Endoscopic Excision of Prostatic Obstruction, J. Urol. **34**:396 (Nov.) 1935.
8. Hinman, Frank: Problem of Prostatism, California & West. Med. **42**:234 (April) 1935.
9. Mathé, Charles Pierre, and Ballescá, A. Gonzalez: Present Day Status of Surgical Problems of Hypertrophy of Prostate, Urol. & Cutan. Rev. **39**:525 (Aug.) 1935.
10. Smith, Clinton K., and Stockwell, A. Lloyd: Preliminary Shrinkage of Prostate in Transurethral Resection, Together with Histological Study of Action of Coagulating and Cutting Currents, Urol. **34**:31 (July) 1935.
11. Bumpus, H. C.: Avoidance of Complications of Prostatic Resection, Southwestern Med. **20**:85 (March) 1936.
12. Nesbit, Reed M.: Transurethral Prostatic Resection: Evaluation Based Upon Study of Four Hundred Cases, Urol. & Cutan. Rev. **38**:3 (Aug.) 1934.
13. Engel, W. J.: Transurethral Resection of Prostate, Cleveland Clin. Quart. **3**:101 (April) 1936.
14. Barney, J. Dellenger: Experiences with Prostatic Resection, New England J. Med. **210**:349 (Feb. 15) 1934.
15. Hicks James B.: Prostatic Resection at Lahey Clinic, New England J. Med. **210**:358 (Feb. 15) 1934.
16. Thompson, Greshom J.: Prevention of Complications of Transurethral Prostatic Resection, Urol. & Cutan. Rev. **38**:847 (Dec.) 1934.
17. Myers, Hu C.: Present Status of Transurethral Prostatic Resection, West Virginia M. J. **32**:173 (April) 1936.

SCIENCE, NEWS, COMMENTS

Tests Pick Mental Patients Who Will Respond to Insulin

Simple psychological tests that will enable physicians to pick out in advance from their mental patients many of the tragic few who cannot respond to the new insulin shock treatment have been found at the New York State Psychiatric Institute.

This announcement, which may in future spare patients and their families unnecessary expense and discomfort as well as the tragedy of hopes raised in vain, was made by Dr. M. Marjorie Bolles, George P. Rosen, and Dr. Carney Landis (*Psychiatric Quarterly*, October).

Although the tests do not permit perfect prediction of success or failure with the insulin treatment, they do make it possible for the physician to estimate a patient's chances with a very fair degree of accuracy. They are much more accurate than any method of prognosis previously used.

The discoverer of the insulin shock treatment for schizophrenia, Dr. Manfred Sakel, had observed that fairly young persons who had not been ill long would have the best chance for recovery with the new treatment. Experience has shown, however, that both young and old recover and both young and old fail to respond.

In the new experiment here, a man 27 years old who had been mentally deranged for thirteen years, but who made high scores on the tests, got well after the violent shock of the insulin treatment. Yet a young girl of 16 years who had been ill only two years, but who made lower scores, remained unimproved. Unimproved also were two young women who had been ill only one month.

In general, those patients whose scores on the tests were relatively low did not improve under the treatment; those who did better on the tests than others in the group, showed the most improvement.

The tests used are very easily administered and simply require the patient to sort out certain objects placed before him. Dr. Bolles, working with Dr. K. Goldstein, had previously found that schizophrenic patients differ from normal individuals in their ability to do such sorting. The disease appears to impair a person's ability to form a new concept or to think abstractly in a way required for sorting or organizing facts or objects.

The schizophrenic cannot readily observe the general category to which several articles belong and finds it difficult to shift his thinking from one aspect of a situation to another. The extent of this

impairment in abstract thinking has now been found to be related to the chances the patient has for recovery under the insulin treatment.

So far the tests have been given to only 19 patients who later received the insulin treatment. This number is too small, the investigators warn, to permit wide generalization. The results do, however, "indicate that careful psychological testing before and after insulin is scientifically valuable and may contribute information of prognostic significance."

An investigation of a large number of cases is now being made. — *Science News Letter*.

First Vitamin Discoverer Given Belated Recognition

Credit for the first discovery of a vitamin is given nearly 40 years after the discovery, to the true discoverer of bios, Professor Emeritus Manille Ide, of the University of Louvain, Belgium. The fact that it was Prof. Ide and not his assistant, Dr. E. Wildiers, who actually discovered this substance, is reported by Dr. Roger J. Williams, of Oregon State College. (*Science*, Nov. 18)

Bios is the substance that is responsible for stimulating growth of yeast, as the more familiar alphabetized vitamins stimulate growth in man and other animals.

Dr. Wildiers, generally credited with discovering bios, was, according to Dr. Williams who investigated the matter while in Europe last summer, "an immature undergraduate medical student of comparatively mediocre attainments at the University of Louvain" who helped Dr. Ide with the research leading to discovery of bios. Dr. Wildiers who never did any more research after finishing medical school, got credit for the discovery because Dr. Ide permitted him to use the results of the research in a competition thesis on which Wildiers' name, but not Ide's appeared. Dr. Wildiers is now dead. — *Science News Letter*.

Migraine Headaches Stopped by Breathing Pure Oxygen at the Mayo Clinic

Oxygen tanks and gas masks are coming to the rescue of migraine headache sufferers. Breathing pure oxygen brings prompt relief from these prostrating headaches, for which no generally satisfactory treatment has yet been found, Dr. Walter C. Alvarez of the Mayo Clinic announces. The idea of using oxygen came from a layman, Charles E. Rhein of the Linde Air Products Company. For two years, Mr. Rhein told the Mayo Clinic physicians, he had been checking the severe migraine attacks of one of his relatives by having her breathe pure oxygen. She was a patient whom Dr. Alvarez had previously been un-

able to help by any known form of treatment.

Using the mask devised by Drs. Walter Boothby, W. Randolph Lovelace and A. L. Bulbulian of the Mayo Clinic, which is now being installed on transport planes for use at high altitudes, Dr. Alvarez tried oxygen inhalations for other migraine patients. In one case inhalation of oxygen for one hour brought prompt relief. Another patient who had had frequent migraine attacks for years has not had a bad headache since she has started breathing oxygen at the beginning of a spell.

Headaches which are not typically migrainous, however, are not helped.

Cost of the treatment after initial expense of the inhalation apparatus is not much and with the Boothby-Lovelace-Bulbulian mask patients can talk, and if not too badly prostrated, can sit up and read or do some work. — *Science News Letter*.

People of Future Will Be Bigger But Maybe Not Better

Taller, more robust men and women, but with poorer teeth than we have now, will make up the population of the future if trends of the immediate past and the present continue, Dr. Harry L. Shapiro, anthropologist of the American Museum of Natural History, told the American Philosophical Society in a symposium arranged by the Population Association of America.

But while Dr. Shapiro was willing to forecast what the people of the future will look like, he would undertake no prophecy as to their mental and biological quality. Bigger doesn't always mean better, he reminded his audience.

A great deal will depend on what living conditions are provided for future generations, he said. There is no certainty that the change for the bigger observable in such diverse groups as college students, army recruits, and the children of Japanese immigrants in Hawaii is part of a general evolutionary sweep. More likely it is simply a matter of better nutrition and living conditions. And there is no assurance that the higher IQ level observed in these bigger individuals of the younger generation has any necessary connection with their size.

Mixing of races, which it is now fashionable in some circles to view with alarm, Dr. Shapiro was inclined to think on the whole a good thing. His only concern over the American melting-pot was that in recent decades various stocks had been dumped in so fast that they have tended to form clumps that refuse to melt together. He spoke favorably of such internal migration movements as the drifting out of part of the old native New England stock and their replacement by French Canadians, Italians and Poles who intermarry with the stay-at-home Yankees.

Farms of the future will become larger and farm families smaller, if present and recent trends continue in the better farm areas of the nation, Dr. C. C. Taylor, head of the division of farm popu-

lation and rural life, U. S. Department of Agriculture, ventured as his prophecy.

"Under normal price levels, farms in these areas will become more profitable, net incomes per farm and family will be higher, levels of living will be higher, urbanization will increase, and birth rates will fall," said Dr. Taylor. "The poorer land areas of the nation, on the other hand, unless zoned against occupancies of certain types, will continue as small farm areas, incomes will remain low, mechanization will advance slowly if at all, birth rates will continue considerably above the national level, and although there will be migration out during periods of prosperity, there will be considerable in-migration in periods of depression."

Mechanization of farming, as seen by Dr. Taylor, has made vast changes not only in the material standards of living and of labor on the better American farms; it has changed the farmer's way of thinking. He is essentially a businessman, producing goods for the market. The pioneer way of living and thinking, wherein most goods for family consumption were produced and processed at home, and most thinking accordingly centered at home, survives mainly now in what we are pleased to call the "backward" areas. — *Science News Letter*.

Sound Waves are Tried as Cancer Treatment

A new approach to the problem of treating cancer by the use of ultrasonic sound waves was reported to the American Chemical Society.

The procedure was revealed "as a preliminary investigation of the last few months" by Dr. John C. Krantz, Jr., and Frances F. Beck of the University of Maryland.

Ultrasonic sound waves vibrating 300,000 times a second have been used to study changes in the metabolism of cancer cells in rats. The scientists hope to find some differential effect of the sound waves on cancer tissue and normal tissue. As their goal, the scientists are seeking to destroy cancer cells without harming normal surrounding tissue.

The tests conducted by Dr. Krantz were carried out with rats which had been inoculated with abdominal cancer. The tumorous growth from the rats was suspended in an oil bath which contained two vibrating quartz plates. The intense oscillations of the supersonic waves make the cancer cells vibrate.

The test of the effect of the sound waves on the cancer cells was to determine how the tumor could use glucose (sugar) which was injected into the tumor. So new is the research that no positive beneficial effect has so far been noted, Dr. Krantz said. However, the studies are being continued because of their fundamental and important objectives.

In its way, the new method offers the possibility of using a new physical method of treating cancer which may, if it proves successful, some day rank with x-rays and gamma rays in cancer therapy. — *Science News Letter*.

Blue Dye May Have Role In Sulfanilamide Treatment

When patients getting sulfanilamide treatment turn blue, as a number of them alarmingly do, it may be helpful to inject into their veins a blue dye, methylene blue. Dr. William B. Wendel, of the University of Tennessee College of Medicine, makes this suggestion on the basis of investigations he has made there and at Washington University School of Medicine, St. Louis.

Dr. Wendel has just reported details of his investigations to the scientific publication, the *Journal of Clinical Investigation*. Associated with him in part of the investigations were Dr. Alexis F. Hartman of Washington University and Dr. Anna Dulancy of the University of Tennessee.

Methylene blue is the same dye that was widely heralded a few years ago as a life-saving antidote in cases of carbon monoxide and cyanide poisoning. According to Dr. Wendel's studies, the dye may find a new field of usefulness by making sulfanilamide treatment less hazardous for some patients, especially those having heart and respiratory involvement, and by making it possible to give larger doses of sulfanilamide, thus extending its usefulness in combating infections.

Dr. Wendel believes that the reason some patients turn blue when under sulfanilamide treatment is because some of the oxygen-carrying hemoglobin of their blood is converted into methemoglobin, which cannot carry oxygen. As a result the tissues of the body are at least partially suffocated. If this condition went far enough it would end fatally.

When methylene blue is injected into the veins, the methemoglobin disappears rapidly from the blood and is replaced by an equivalent amount of hemoglobin, Dr. Wendel reports.

Medical scientists are not all agreed that development of methemoglobin is the cause of the blueness (cyanosis is the technical term) of some patients during sulfanilamide treatment. Dr. Wendel points out that the frequency of methemoglobin development following sulfanilamide treatment has not been determined, but he and his associates found at least traces of this chemical in the blood of approximately 98 out of 100 patients who were getting sulfanilamide. He therefore believes the use of methylene blue as an aid to sulfanilamide treatment is worth trying, although he cautions that small amounts of the dye should be used and that it should be injected slowly and carefully into the veins. — *Science News Letter*.

Defense of Democracy Urged at Meeting of Scientists

Keynoting for a host of scientist speakers at Lincoln's birthday rallies in 26 cities and university centers throughout the country, Secretary of Agriculture Wallace summoned his fellow-scientists and fellow-citizens to a crusade in defense of democracy and against persecution of racial minorities.

Beliefs that one race is superior to another have no basis in scientific fact, Secretary Wallace, known among men of science as an expert plant breeder,

declared at a mass meeting attended by more than 1,000 scientists in the Waldorf-Astoria Hotel in New York City.

"Let us dedicate ourselves anew to our democratic body of faith," he urged, "to the promotion of a stable but ascending general welfare . . . Let us dedicate ourselves anew to the belief that there are extraordinary possibilities in both man and nature which have not yet been realized, and which can be made manifest only if the individualistic yet co-operative genius of democratic institutions is preserved."

Outstanding men have arisen in all racial groups and will continue to arise, in even greater numbers, if their environments provide them with the opportunity, the secretary continued. "The seed bed of the great leaders of the future, as of those of the past, is in the rank and file of the people."

American scientists will create an organization to strengthen democracy and to defend sciences' precious right to freedom of research, Prof. Franz Boas, Columbia University's noted anthropologist, pledged at the rally, which was called by the Lincoln's Birthday Committee for Democracy and Intellectual Freedom of which Prof. Boas is chairman.

Attacking the pseudo-scientific basis for exaggerated racial claims of apologists for Nazism, Mr. Wallace declared "the color of a cow's hair, for instance, has nothing to do with her ability to produce milk and there is no reason to think that the color of a man's hair has anything to do with his ability to produce ideas.

"And so it is quite possible that the master breeder, being concerned primarily with physical appearance, would find he had produced a group of blonde morons — useful to him mainly as a superior type of cannon fodder," he asserted.

Democratic peoples must be continually on guard to defend their freedom, Prof. Boas warned, in pledging that scientists will do their part. Though he identified the totalitarian states as the main threat, he recalled that a "bigoted majority may be as dangerous to free thought as the heavy hand of a dictator."

Twenty-eight leading men of science, including Nobel prizeman Harold C. Urey of Columbia, who was chairman of the New York rally, compose the newly-organized Lincoln's Birthday Committee. — *Science News Letter*.

Study Electric Properties of Ragweed Pollen Protein

Tiny quartz particles and oil droplets, covered with the protein of ragweed, are riding up and down in apparatus at the laboratory of Dr. Harold A. Abramson, of Columbia University and Mt Sinai Hospital, to disclose new facts that may lead to improved methods of treating hay fever and to new methods of skin testing.

In a report to the conference on electrophoresis of the New York Academy of Sciences, Dr. Abramson described his new studies in connection with an address on the history and recent advances in electrophoretic methods.

It is the surface properties of the protein in rag-

weed which are in part responsible for hay fever, Dr. Abramson said. The surface properties, in turn, are determined by the electrical charge on the surface.

Using a method basically similar to that which Prof. Robert A. Millikan employed in measuring the electrical charge on the electron — one of the all-time masterpieces of physical research — Dr. Abramson makes the protein-coated quartz and oil droplets ride up and down in an electric field. The

speed of passage is a measure of the electrical surface properties of ragweed protein found in the pollen.

"On the basis of the electrical charge of ragweed, experiments on the application of the electrophoretic method, that is, electrical introduction instead of injection of ragweed into the skin, to hayfever therapy are in progress," Dr. Abramson declared. — *Science News Letter*.

The Psychologic Importance of Play in a Children's Hospital — Smith

(Continued from page 364)

simple wood work, wood and brass tapping, and made some of their own games.

In contradistinction to the method usually employed in occupational or physical therapy, all these activities were presented as play and according to the child's desires; not as a class or individual work project, nor as an aid in the cure of some specific ill. There was a decided difference in results when the handicapped child participated in an occupation because it was play, full of interest and fun for all, and not a specific remedy prescribed by a physician for his special disability. Absorbed in play, their physical handicaps were forgotten, but at the same time the disabled portions of their bodies were receiving far more exercise functioning in a more normal way because each child's attention was directed away from his disability. Released from the inhibiting effects of focusing their attention on their defects, the children appeared free and spontaneous. Their creative abilities were stimulated and a spiritual drive sustained their interest.

In health the body and the mind function smoothly as a harmonious, integrated unit. Separating the physical from the social and educational aspects appears to limit the effectiveness of any therapy with children. The study of the disease outbalances the study of the whole child as a patient. Where the group play method is used inhibitions are released. The child responds unreservedly, wholeheartedly, unselfconsciously, to spontaneous interstimulation. Many characteristics are revealed in definite, understandable patterns that can be met in practical fashion. Group play gives a far more complete picture of the individual participants than does the case study method usually employed. The physical, mental, emotional, social, and moral aspects are kept in a related whole, not only with regard to the moment and age period, but as a part of the continuously developing human being. This makes synthesis easier when analyzing situations involving behavior problems. In fact, through the wise use of play, many a child can be kept from passing over into the problem class. Group play in itself is a method that permits the child to overcome negativistic or anti-social behavior.

"Play appears to be the method provided by nature for the child to grow." No longer regarded in progressive hospitals as mere amusement or as a tool to keep the children quiet and orderly, its unique values are beginning to be appreciated and used. To those who have seen group play demonstrated with sick children, it seems impossible that any children's hospital can consider itself well-managed that does not offer a complete program of play for its patients.

THE STUDENT'S LIBRARY

INFRA-RED IRRADIATION. By *William Beaumont*, M.R.C.S. (Eng.), L.R.C.P. (Lond.). Honorary Physician and Medical Director, Institute of Ray Therapy; Physician in Charge, Physiotherapy Department, Westminster Hospital, etc. With a Foreword by Lord *Horder*, K.C.V.O. Second Edition. Cloth. Pp. 159 with 26 illustrations. Price 6/6 Net. London: H. K. Lewis & Co., Ltd., 1939.

This small brochure is a timely addition to the literature on infra-red therapy because it offers a concise and lucid review of its possibilities and limitations. The fact that a second edition was called for shortly after the first publication is an index that Beaumont not only presented his thesis on infra-red irradiation in a manner to arouse the support of certain leaders in the profession but the approval of the general practitioner. This is exemplified by the warm foreword by Lord Horder who is in an authoritative position to "welcome Dr. Beaumont's concise and yet complete treatise on Infra-Red Irradiation," and the no less favorable comments elicited from widely scattered sources. In its present literary format the work represents an intelligent and critical effort to evaluate the data on this widely used and greatly abused procedure in a practical and conservative manner. To this edition has been added, due to many requests, a section on the combined advantages of infra-red with that of other therapeutic measures, including massage; a more detailed exposition on the matter of penetration and absorption of certain portions of the infra-red spectrum, and a complete recasting of the chapter dealing with the problem of apparatus. It is interesting to note that the author takes the view that the energy emitted as infra-red is not in its physiologic influence or action one and the same because wavelength and the factors of penetration and absorption are as tangible in their influence as are the wavelengths in the ultraviolet region. This view and other certain technical considerations of a practical and theoretic interest are introduced and elucidated in the space of seven comprehensive and well organized chapters to which is also included an appendix and index. The introductory section reviews the historic basis and evolution of infra-red therapy, pointing out that a multiplicity of objectionable terms and loose classifications have with passing time accumulated about this procedure, which in turn has made for confusion, led to misinterpretations and eventually to condemnation of the procedure as a quasi-therapeutic remedy, more psychologic than physiologic in its potency. The first three of the six succeeding chapters discuss the physical basis of infra-red irradiation; its physiologic effects; the types of apparatuses to be employed and their distinctive clinical value. The final chapters are of distinct clinical value, for they review the technic most useful when using luminous

or non-luminous generators for local or general effects in connection with the treatment of certain common symptoms, and their application to "conditions which have a more or less well defined pathologic basis." This and the appended data expatiate at some detail on the value of infra-red in the rheumatic syndrome, skin and vascular disturbances, and the like, and are supported by an analysis of 1000 clinical cases presented in tabulated form. It is clear that the author has presented a workable approach to the scientific employment of infra-red radiation. Written for easy understanding and perhaps popular consumption, it has omitted a great deal of the basic information which is usually so technical in its terminology and so formidable in its formulas as to be understood by the few and misunderstood by the masses. Though this brochure does not fulfill the hope of being all pleasing and all complete in its exposition of infra-red therapy, it nevertheless has presented a concise, critical and conservative evaluation as to be accepted as a workable and reliable guide for clinical purposes.

MOORE, SCHLAMME, ERDEN (PELOIDE). IHRE NATURGESCHICHTE SOWIE IHRE CHEMISCHEN UND PHYSIKALISCHEN EIGENSCHAFTEN UND WIRKUNGEN. By Dr. *H. Benade*, Chemiker an der Preussischen Geologischen Landesanstalt. Berlin. Boards. Pp. 148 with 30 illustrations. Price, 9 RM. (Volume 10 of the collected works *DER RHEUMATISMUS*, Edited by Prof. Dr. *Rudolph Jürgens*, Berlin.) Dresden and Leipzig: Theodor Steinkopff, 1938.

This contribution impresses one as a particularly timely and highly informative study with reference to a method of treatment (Pelotherapy) that has come down from antiquity as a useful adjuvant in the management of rheumatic affections. The volume is the tenth of a series of thirty-three books edited by Professor Rudolph Jürgens and deals especially with the historic development of the uses of various types of mud baths, their physical and chemical qualities and therapeutic action. It places before the profession a modern interpretation of the many scientific advantages inherent in this ancient and revived practice of mineral, organic, inorganic, volcanic and other varieties of mud baths by reviewing the historic basis for their procedure and evaluating their physical and physiologic nature in a most comprehensive and scholarly fashion. In the space of six chapters Benade has managed to present a lucid and detailed review of their historic background, the geologic classification, definition and differentiation of pelotherapy. Chapters four to six will be found of especial interest because they include exhaustive studies of the chemical qualities and action of mud therapy and provide technics for its application along lines practiced by ancient and modern schools. This work is un-

questionably the most important of its kind that has come to the attention of the reviewer, for it contains information of positive therapeutic value to the rheumatic individual. It provides a scholarly orientation on a much neglected phase in the management of the arthritic patient and is of special value as a method of treatment for spas, hospitals and the like.

FRACTURES AND DISLOCATIONS IN GENERAL PRACTICE. By *John Hosford*, M.S. Lond., F.R.C.S. Eng.; Assistant Surgeon to St. Bartholomew Hospital; Late Hunterian Professor, Royal College Surgeons. Cloth. Pp. 274 with 71 illustrations. Price, 12 s. 6 d. net. London: H. K. Lewis & Co., Ltd., 1938.

The volumes written on this topic and under the title of fractures and dislocations are today legion and have often become so bulky that it is difficult for the busy physician or novice to select from these sources the method most suitable or convenient for his purpose. The author of this volume attempts to recommend certain special methods from his broad experience as teacher and assistant surgeon to St. Bartholomew Hospital. Briefly, the above work has been carried out in response to requests from students and recently qualified men for a concise and practical manual regarding the manner of best management of fractures. Accordingly the manuscript was prepared in a style that catered to brevity and clarity, but was purposely restricted in scope because it left to larger works the description of "details of open operations on fractures and complicated methods of skeletal traction." The exposition is therefore thoroughly comprehensive if not altogether voluminous, and contains more practical than theoretical, more specific than general information on the subject. The contents are divided into two parts — general and special. The first deals with general facts, techniques and material most useful for fracture orientation. The second part consisting of 20 concise chapters that devote special emphasis on the various fractures and dislocations that may be encountered in every-day routine practice. A special chapter is appended which gives a brief sketch of the lives of Pott, Colles, Smith, Thomas and Bennett, names that have become by-words in the study of fractures. The exposition is clear, but brief and carries a well prepared index.

JACOB HENLE: ON MIASMATA AND CONTAGIA. Translated by *George Rosen*, M.D. Cloth. Pp. 77. Price \$1.25. Baltimore: The Johns Hopkins Press, 1938.

The fact that certain leading medical centers in America are encouraging extra-mural reading along definite pathways is an index that medical educators appreciate that a tremendous amount of inspirational information in the form of fundamental historic contributions must be made known to our novitiates regardless of overcrowded curriculums. Through this medium the student often obtains the very first glimpse of the majesty and aristocracy of his call-

ing, and thus awakens in him an enthusiasm and deep respect far more stirring and lasting than can be obtained from laboratory and bedside experiences, alone. Such reading gives him the vicarious thrill of participation in the trials and successes of his predecessors in the same fraternal order, and makes him kin to instead of an individual apart from the recorded heroes of medical history. It goes without saying that the most perfect source of such inspiration is to be had by viewing these suggested literary contributions in their original setting and nuance, that is to say, in their own language. Fortunately, those deprived of such a privilege can often obtain by suitable translations, clear and comprehensive expositions sufficient to make the extra reading a worth while investment. Such a book is this under consideration. It is a translation of Jacob Henle's brochure from the German original, and provides those linguistically handicapped an intimate and vivid recapitulation of an important turning point in medical history. In masterly descriptive strokes the author introduces the personality of Henle and develops the far reaching implication of his work. Rosen points out that Henle's great contribution was by far more the result of deductive reasoning than any original discovery. It is recalled that in 1840 Jacob Henle, then only 31 years of age and early in his duties of Professor of Anatomy at the University of Zürich, published his "Pathologische Untersuchungen," which since has become the landmark as the first consistent and correlated argument responsible for the development of the science of bacteriology in relation to infectious disease. In this brochure Henle formulated his reasons for his conviction that "Contagia Animata," that is, living organisms, were the cause of infections and contagions. Surprising as it may seem, the basis of this now important branch of medicine was culled from Pliny's opinion on swamp fever, the ancient Arabian theory of the parasitic nature of scabies, and the numerous observations of Leeuwenhoek and others. The significance of Henle's contribution lies in the fact that he took the entire mass of conflicting and apparently unrelated data and organized it into a convincing structure, the basis of which was the constant stressing of the parasitic nature of disease and the postulation of certain problems which were solved some thirty years later by his famous pupil, Robert Koch. From what has been said it is readily appreciated that any student of medical history or of infectious disease will find in these pages an inspirational and informative background for the theories and practices since then advanced and broaden his medical orientation to a degree consistent with the brilliance of its historic development. Dr. Rosen and the Johns Hopkins Press are to be felicitated on a worth while contribution and should be encouraged by proper support to further such an educational program.

THE 1938 YEAR BOOK OF OBSTETRICS AND GYNECOLOGY. OBSTETRICS. Edited by *Joseph B. De Lee*, A.M., M.D., Professor of Obstetrics, University of Chicago Medical School, etc.; GYNECOLOGY. Edited by *J. P. Greenhill*, B.S., M.D.

F.A.C.S., Professor of Obstetrics and Gynecology, Loyola University Medical School, etc. Cloth. Price \$2.50. Pp. 672 with 139 illustrations. Chicago: The Year Book Publishers, 1939.

Once more the Year Book of Obstetrics and Gynecology is offered to the practitioner and specialist as a survey of the literature of the year just passed. Its contents are easy to assimilate and enhanced by frequent editorial comments both concise and cogent in style. Their personal comments, based on many years of practical experience, and their knowledge of concurrent or recent literature makes this a highly valued feature of the year book. Wherever illustrations add to the value of abstracts, they are included in this book. Thus on operative technic one finds step by step illustrations taken from the original articles. The book follows the same plan as heretofore and thus one is afforded easy comparison of the trend of literature from year to year. Thus medical complications that may arise during pregnancy again receive adequate attention by the contributors of the 1938 literature; also newer developments in x-ray pelvimetry. Fetal heart tones may now be listened to continuously throughout labor by a loud speaker. Although this method is now expensive, it is likely to undergo more improvement and the future of its development offers much hope. Analgesia during labor is still a practical concern of many contributors to the literature. The editors again caution that the ideal analgesic from the standpoint of the unborn baby or the mother, is still unknown. They unequivocally condemn spinal anaesthesia for cesarian section. Cervical erosions may in many instances be cleared up or improved by restoring the vaginal reaction to its normal acidity (pH 4). This may be accomplished by vinegar douches or acid fermenting medication. Many favorable comments are found on conization procedures versus operative plastics on the cervix. The section on endocrinology is virtually complete. Near the close of the book the editors have presented in tabular form, differential findings both clinically or pathologically of the granulosa cell, arrhenoblastoma or dysgerminoma tumors. It is the reviewer's pleasure again to endorse and recommend this book for the special and general medical practitioner.

IMMUNITY, PRINCIPLES AND APPLICATION IN MEDICINE AND PUBLIC HEALTH. By *Hans Zinsser*, M.D., Professor of Bacteriology and Immunology, Harvard Medical School; *John F. Enders*, Ph.D., Assistant Professor of Bacteriology and Immunology, Harvard Medical School; and *LeRoy D. Fothergill*, M.D., Assistant Professor of Bacteriology and Immunology and Associate in Pediatrics, Harvard Medical School. Fifth Edition of "Resistance to Infectious Diseases." Cloth. Pp. 801. Price, \$1.75. New York: The Macmillan Company, 1939.

The advancements in immunological science have permitted Zinsser, Fothergill and Enders radically to revise this, the fifth edition of this now famous work, "Resistance to Infectious Disease." Incorporated in this volume is the cumulation of new

research that has so markedly enriched the study of this important subject. For instance, it reviews the nature of antigens and antibodies, the principles of anaphylaxis, and the application of immunologic knowledge to medicine and public health. In view of the practical import of this work, it is not untimely to felicitate the authors on their critical evaluation of the material and its clear medical exposition. They have succinctly reviewed the newer problems that confront one in this field and reasserted as well as clarified the older problems. So far as concerns the newer problems, the correlation of the various phenomena of anaphylaxis will be viewed as a happy solution to the maze of confusing classification and theory that marks the various types of hypersensitive reaction. The reassertion of the unitarian concept of antibody action is likewise a contribution of no small significance. This theory has long been the foundling idea of the Harvard group of workers, and the accumulated evidence is now presented in a manner that will support the wisdom of their greatly refined impression. Structurally this fifth edition is conceived in two sections and is designed to satisfy both the laboratory worker and the practitioner. The first section deals primarily with the principles of immunology and is of both practical and fundamental importance. The second section intended for the practitioner is devoted to the application of all those principles that have aided diagnosis, prevention or treatment of disease. This work provides a highly authoritative yet easily understood insight into the facts and theories of immunology of value to both students and practitioners.

DISEASES OF THE NOSE, THROAT AND EAR. By *W. Wallace Morrison*, M.D., Clinical Professor and Chief of Clinic, Department of Otolaryngology, New York Polyclinic Medical School and Hospital. Cloth. Price, \$5.50. Pp. 675, with illustrations. Philadelphia and London: W. B. Saunders Company, 1939.

Although the present book epitomizes much of the material gathered and organized for the teaching of otolaryngology to postgraduate students, it has been written entirely for the undergraduate and the general practitioner. The author has been exceedingly careful in the choice of material. He has striven and succeeded in being not only concise but clear. He deals briefly with rare conditions and stresses the commoner diseases. He aims to be practical rather than theoretical. The style is an acceptable one. Although the pathologic considerations are brief, the important points are described or illustrated. It is the firm belief of the author that a knowledge of the gross and microscopic changes is essential to the understanding of the causation of symptoms and physical signs. The methods of physical examination have been emphasized. Surgical operations are described very briefly because the author believes that detailed information is desirable only for the postgraduate student. An interesting feature of the book is the illustrative material, all of the art work having been done by the

author. In this respect it differs from most texts. Allergic diseases of the respiratory tract are considered in a rational form, and it is appropriate that a chapter dealing with this subject is presented from the rhinologist's viewpoint. Peroral endoscopy is all covered in good style, and sufficient information is given for the student to obtain a perspective of modern innovations in this field. The new material available on petrositis is included. There are also two chapters on miscellaneous otologic conditions. Therapy is a valuable feature of the book and no branch has been omitted. Physical therapeutic methods are advocated in numerous instances and it is obvious from the descriptions of technic that the author has had personal experience with the special procedures. The book is a well rounded contribution and a valuable addition to any library.

BOOKS RECEIVED. Acknowledgment is made of the receipt of the following monographs in the Ukrainian language from the Ukrainian Association for Cultural Relations with Foreign Countries, Kiev,

Melnika 44, U. S. S. R. All of them have summaries in the French language.

ROENTGENOLOGY AND ONCOLOGY IN THE UKRAINE REPUBLIC. REPORTS AND ARTICLES FROM THE STAFF OF THE UKRAINIAN CENTRAL ROENTGEN-RADIOLOGIC INSTITUTE. Cloth. Pp. 309. 1938.

PARADOXICAL OBESITY AND GOOD NUTRITION IN CANCER. By *B. Koutcherenko*. Paper. Pp. 168. 1937.

EXPERIMENTAL MEDICINE. Paper. Pp. 110. 1938.

BIOCHEMICAL DYNAMICS OF THE SUPRARENAL GLANDS. By *Prof. A. M. Outersky*. Paper. Pp. 77. 1938.

HYPERERGIC REACTIONS, EXPERIMENTAL AND CLINICAL. Edited by *Prof. D. E. Alpern*. Pp. 240. 1938.

ENDOCRINE GLANDS AND MALIGNANT TUMORS. By *Prof. Koutcherenko*. Paper. Pp. 1938.

Clinical Results of Fever Therapy—Elkins and Krusen

(Continued from page 353)

5. Cook, E. N.: Discussion of Elkins, E. C., and Krusen, F. H.: Fever Therapy in Resistant Gonorrhea; With Especial Reference to Its Relationship to Sulfanilamide Therapy of Gonorrhea, *Proc. Staff Meet., Mayo Clin.* **13**:303 (May 11) 1938.

6. Desjardins, A. U.; Stuhler, L. G., and Popp, W. C.: Fever Therapy for Gonococcal Infections; II. *J. A. M. A.* **106**:690 (Feb. 29) 1936.

7. Krusen, F. H.; Randall, L. M., and Stuhler, L. G.: Fever Therapy Plus Additional Local Heating in the Treatment of Gonorrhea, *Am. J. Syph., Gonorr. & Ven. Dis.* **22**:185 (Mar.) 1938.

8. Osborne, S. L.; Blatt, M. L., and Neymann, C. A.: Electropyrrexia in Rheumatic Carditis, Chorea and Certain Other Childhood Diseases in Fever Therapy Abstracts and Discussions of Papers Presented at the First International Conference on Fever Therapy, New York, Paul B. Hoeber, Inc., 1937, pp. 68-69.

9. Prickman, L. E., and Popp, W. C.: Treatment of Brucellosis by Hyperpyrexia Induced by the Simpson-Kettering Hypertherm, *Proc. Staff Meet., Mayo Clin.* **11**:506 (Aug. 5) 1936.

10. Prickman, L. E.; Bennett, R. L., and Krusen, F. H.: Treatment of Brucellosis by Physically Induced Hyperpyrexia, *Proc. Staff Meet., Mayo Clin.* **13**:321 (May 25) 1938.

11. Simpson, W. M.: Discussion of Hefke, H. W.: Report on the First Year of Fever Therapy at the Milwaukee Hospital, Fifth Annual Fever Conference, Dayton, Ohio, May 2 and 3, 1935, p. 30.

12. Thompson, Luther; Sheard, Charles, and Larson, Nora: The Effect of Heat at 107 F. (41.8 C.) on Various Bacteria, *Proc. Staff Meet., Mayo Clin.* **11**:319 (May 13) 1936.

13. Warren, S. L.; Carpenter, C. M., and Boak, R. A.: The Basic Principles for the Cure of Gonococcal Infections by a Single Fever Treatment, Abstract Papers and Discussions, Fifth Annual Fever Conference, Dayton, Ohio, May 2 and 3, 1935, pp. 5-6.

INTERNATIONAL ABSTRACTS

Occupational Therapy Modernized. Mary E. Merritt.

Modern Hospital 51:75 (Dec.) 1938.

This author states that the following reorganization was initiated in the Department of Hospitals, New York City, with first attention given to general hospitals. Occupations were listed and regarded as graduated exercises. Each department was equipped so that this would be possible. Only the simplest tools, materials and equipment were installed for use. All cumbersome technic was eliminated. For most knee disabilities, a seatless bicycle saw and chairs of varying heights are used. The higher the chair and the farther away it is placed, the greater the extension of the knee. Occupations and materials are adapted for all joint and muscle functions. The incentive always is something to make that is of interest to the patient. It matters not whether the patient is man, woman or child.

To reeducate the patient and their relatives in regard to this revised program, new patients were told that the occupational therapy department was just the same as any other department of a hospital and strictly a treatment agency, except that other departments do not pay the patient for receiving treatment. Occupational therapists were instructed as soon as practicable, to accept no new patients without such a card filled and signed by the physician. This card eventually brought most doctors to the occupational therapy workroom or office to see what it was all about. These doctors found that certain occupational therapy workers had acquired another vocabulary. They no longer talked paints, nails and cross stitch, but had acquired sufficient medical information to confer with him in regard to indicated treatment. The physician frequently saw two large charts on the workshop walls; chart 1 showing the craft analyses and chart 2, a diagram illustrating the recording of growing measurements. A simple homemade arthrometer which was accurately recording the progress of his patients was demonstrated. The doctor also found that progress charts of each patient were on file.

Short Wave Therapy in Pulmonary Empyema. W. Dieker.

Fortschr. a. d. Geb. d. Roentgenstrahlen. 59:193 (March) 1939.

Dieker reports the results of short wave treatment in thirty-two unselected cases of empyema of the lung. Five of the thirty-two patients are excluded from final consideration because short wave treatment was employed as the last desperate resort and did not exceed four treatments. Of

the remaining twenty-seven, nineteen recovered, three improved, two had to be operated on and recovered, two died and one was still under treatment. The conjectured duration of illness before treatment ranged from five to 110 days; the number of treatments given, exclusive of the five patients who died, from twenty-five to ninety; the duration of illness after the treatment lasted from thirty-four to 197 days. Many of these patients were extremely ill, creating doubt as to whether surgery ought not to be applied. Some patients were past surgical help, but the short wave treatments were so favorable that surgical intervention was no longer considered. Most of the patients felt better after the first treatment and showed progressive increase of appetite and weight and decrease of fever and fetid sputum. Simultaneous pleural empyema rendered short wave treatment of empyema of the lung more difficult. The author used the apparatus of Siemens with a 6 meter wavelength and, preferably, the glass electrodes indicated by Schliephake. On patients who could be treated only in bed, rubber electrodes were used, together with layers of perforated felt pads. Daily treatments lasting from five to fifteen or twenty minutes were administered. The determining factor for release was the actual condition of the lung as revealed by roentgenograms. Long-continued treatments caused no injury. The age of the patients (from 18 to 65) was no obstacle to the treatment; neither was the size or site of the empyema. Empyemas larger than a man's fist were successfully treated. Multiple and bilateral empyemas, those of various etiology (except when secondary to bronchiectasis) were successfully treated. Defective delimitation of the empyema, transition into gangrene, pyrexia or the patient's general condition were not allowed to delay treatment. The author concludes that short wave therapy in pulmonary empyema is the least violent of all treatments and, with proper selection of clinical material, promises better results. It can be applied to empyemas of any size or site, to multiple and bilateral empyemas, to empyemas no matter what their etiology, to empyemas that show transition to gangrene, to patients with pyrexia, defective circulation and generally poor conditions and to cases of pleural adhesion of recent origin with promise of improvement and recovery, if treatments are continued for a long time. Treatments, the author says, should not be delayed until delimitation of the empyema has formed but begun as early as possible and be continued until the last vestige of infection has disappeared. Simultaneous pleural empyema makes short wave therapy more difficult and should be previously drained (combined treatment). The author's results are amply confirmed by the compilation of the results ob-

tained by others through short wave therapy. Of 106 patients, eighty-eight recovered, seven improved and eleven died. Statistics for purely conservative treatment of empyema of the lung (hospital, medicines, no short waves) show a mortality rate as high as 75 per cent. The more favorable mortality rate in surgical operations still shows the high average of from 16 to 34 per cent in the experience of experts in surgery of the thorax and is higher in the practice of surgeons who are not chest specialists. — [Abst. J. A. M. A. 112:2574 (June 17) 1939.]

Rationality, Practicability and Limitations of Induced Fever as a Therapeutic Agent. William Benham Snow.

M. Rec. 148:448 (Dec. 21) 1938.

Sustained high temperatures are indicated in gonococcal infections. Unless both the temperatures are above a minimum of 106.5 F., preferably 106.8 F., and unless the hours given are ample and closely grouped, satisfactory results will never be attained. These treatments range from eight to ten or more hours. Slightly lower sustained temperatures of shorter duration, 10 to 106 F., three to eight hours have been found adequate in chorea, syphilis in all stages, acute rheumatic fever, gonorrheal cases in combination with sulfanilamide where the risk of higher temperatures is too great, and undulant fever. Temperatures not exceeding 104 F. sustained for five hours is advocated in luetics who are poorer risks and in whom, as always, antiluetic chemotherapy is being given. The limit of vasodilatation is reached in this range and here much success is had in inflammatory conditions as of the eye, iridocyclitis, keratitis, chronic infectious arthritis, syphilis, and certain skin diseases. Short treatment below 104 F. is of value as a method for stimulation of leukocytosis and moderate increase in metabolic rate. These treatments are indicated in phlebitis, especially in the superficial migratory type, in obesity, chronic infectious arthritis, and common colds.

The author feels that fever therapy will come to be more in use when it is generally appreciated how it speeds recovery in carefully selected disease entities. Gonococcal arthritides occupy beds in institutions for six and seven weeks and are then still therapeutic problems. Two weeks of intensive fever will clear these beds. The same is true in other gonorrheal cases, especially in the female pelvis.

Chorea patients, hospitalized, have had hospital stay cut from ten to twenty days by fever therapy. In phlebitis, the stay of patients in institutions can be cut ten or more days.

Polyneuritis cases, though not strictly bed cases, when in the hospital, can be rapidly mobilized. In acute rheumatic fever, the saving in time of stay in these patients, and avoidance of more severe cardiac complications makes fever therapy of great value. The results in this disease have been most satisfactory.

A Department of Artificial Fever Therapy at Notre Dame Hospital, Montreal. Albéric Marin.
Canadian Hospital 15:13 (Dec.) 1938.

Physical pyreto-therapy is much easier on the patient than an attack of malaria. During the latter, he would have, at first, an intense chill for about an hour, with general uneasiness, articular neuralgia, and then a rise of fever with profuse sudation, which leaves him very weak and anaemic. Moreover the death rate of malaria-therapy ranges from 4 per cent to 15 per cent; personally, of 139 patients treated by malaria, 6 died (approximately 4 per cent). On the other hand no real discomfort, no serious sequelae, accompany or follow physical pyrexia. Some subjects are more or less nervous but they are easily calmed down; others are somnolent during the entire length of the session and have a restful night. The next day, always amazing to those who have known malaria-therapy, the patient will get up, walk, eat and smoke as if nothing had happened the day before. He will have a normal diet and at the end of the treatment have lost neither weight nor strength. There is no period of convalescence.

There are even some who take ambulatory treatments, coming to the hospital once a week and going home the very next day after having had 7 or 8 hours of high temperature. This fact has to emphasize an important advantage of physical pyreto-therapy. A large number of neurosyphilitic persons, whose mental or physical condition is still good, are able to work. Many, indeed, are forced to do so and would find it impossible to pay for a long sojourn at the hospital. The possibility of "ambulatory" artificial fever minimizes this important economic problem and renders this valuable therapeutic agent available to everyone.

Bronchial Asthma. Albert H. Rowe.

J. A. M. A. 111:1827 (Nov. 12) 1938.

The fact that bronchial asthma may disappear or decrease during certain infections has led to the use of fever therapy with varying benefit. In resistant asthma, such fever may be induced by intravenous injections of typhoid bacilli or heat therapy. I have resorted to such therapy in a very few cases. The benefit of roentgen therapy is uncertain and should never supplant the therapeutic recommendations as outlined in this paper. Breathing and other exercises as developed especially in England are of value when deformities or underdevelopment of the chest and its musculature have arisen from chronic asthma. With the control of such asthma, however, with therapy based on existing allergies, indications for these exercises decrease. A warm, dry climate, especially in high altitudes, seems to decrease allergic reactions to foods and also to certain inhalants, but with proper recognition and control of allergenic causes such climatic change is unnecessary. The idea of curing asthma by climate is futile and often leads to financial ruin.

Tuberculous Peritonitis. John G. Stubenbord and Jack Spies.

Surg., Gynec. & Obst. 67:269 (Set.) 1938.

This paper is based on a series of 257 cases of tuberculous peritonitis obtained from medical and surgical records of the following hospitals: Bellevue Hospital, New York; Children's Hospital, Boston; Flushing Hospital, Flushing, Long Island; Massachusetts General Hospital, Boston; Peter Bent Brigham Hospital, Boston; New Haven Hospital, New Haven; New York Hospital, New York.

Tuberculous peritonitis is most prevalent during early life. Treatment consists in absolute rest, approved diet, fresh air, heliotherapy or ultraviolet radiation. Furniss advises light therapy combined with general hygienic measures in restoring the patient's health. It is especially satisfactory in the chronic plastic adhesive type cases with localized peritonitis. In those patients with ulceration and large caseous lymph nodes it is less satisfactory. Brown and Sampson recommend natural or artificial heliotherapy. A word of caution is given at this time, namely: heliotherapeutic exposure in the acute or active (pulmonary) case is dangerous. The following is an outline of the technic used; an Alpine sun lamp that permits a first degree of erythema is repeated every 2 to 3 days. The average treatment is started with a 3 minute exposure front and back at a distance of 33 to 36 inches, and the time is increased by 1 to 2 minutes at each subsequent exposure, until the maximum exposure is 20 to 30 minutes. The course of the treatment ranges between 2 and 3 months. Smith states that, following the use of calcium chloride and sunbaths, the fluid may disappear in tuberculous peritonitis. The largest number of patients who improved were treated surgically (82 per cent); the patients improved after medical treatment numbered only 18 per cent.

Treatment of Some Common Diseases of the Skin. Howard Fox.

J. Michigan M. Soc. 38:32 (January) 1939.

Acne vulgaris responds well to treatment as far as disappearance of the lesions is concerned. No satisfactory method, however, is known of treating pitted scars that occur in the severe cases. In at least 85 per cent, a permanent cure can be obtained by fractional doses of roentgen rays, given at weekly intervals for three to four months. It is always advisable to warn the patient that, after such therapy, scars may be present and that these are due to the disease itself and not to the treatment. Ultraviolet therapy is of some value in persons who tan easily, but its effect is more or less temporary. Soap frictions and sulphur lotions, combined with mechanical methods, are time-honored procedures which suffice for the treatment of mild cases. Vaccine therapy is worthless, though such treatment is still widely employed by the general practitioner.

In treating psoriasis, one may often obtain temporary results, though it is always difficult, in extensive cases, to remove every vestige of the eruption. The treatment can be summed up by the words "soap and water, grease and sunshine." Curiously enough some physicians do not realize that soap and water are nearly always indicated in psoriasis, especially for removal of scales. The best remedy is natural sunshine for persons who are able to acquire a tan. As long as the skin remains tanned, such persons will be largely free from psoriasis. Unfortunately, ultraviolet rays from artificial sources are not as efficacious as the sun's rays. A fairly satisfactory method, however, of using ultraviolet rays from quartz lamps, consists of an application of crude coal tar at night, which is then removed, followed the next day by irradiation (Goeckerman method).

Elliott Treatment of Pelvic Inflammatory Diseases of Ambulatory Women. Earl Conway Smith.

New Orleans M. & S. J. 91:351 (Jan.) 1939.

Smith reports his studies with Elliott treatment in a series of 73 patients. Of these, 12 from either acute and subacute salpingitis; 14 from subacute (non-specific) inflammation of the pelvic organs; 17 from chronic salpingitis; 8 from postabortal parametritis; 8 from postpartal parametritis; 7 from endocervicitis; 3 from senile vaginitis and 4 from postoperative bilateral salpingectomies. The Elliott treatment was tolerated apparently well by all and the recoveries ranged from 75 to over 80 per cent. Apparently prolonged heat therapy has a favorable effect on specific infection including the products of local inflammation, such as tenderness, cellulitis, and the like. The author points out that the group of 17 cases with chronic salpingitis did not respond as promptly as those associated with gram negative intracellular diplococci or local trauma and inflammation. In general the impression is that the treatment is of greater benefit than conventional methods and has a place in the management of pelvic inflammatory diseases.

Sterilization of Air in Operating Room. Deryl Hart.

Arch. Surg. 37:956 (Dec.) 1938.

Attention has been called many times to the prevalence of pathogenic bacteria, predominantly staphylococci, in the air in operating rooms. Deryl Hart has described various precautions and procedures undertaken to eliminate these organisms from the air.

The southern surgeon presents an analysis of the results obtained in a total of 456 clean, primary incisions and 86 reopened clean incisions out of more than 800 operations performed in a field of bactericidal radiation. Compared with the results of the operations performed in this almost bacteria-free atmosphere are those obtained in similar groups of cases in which the patients

were operated on under the same conditions but without the use of bactericidal radiant energy. The statistical summary seems to indicate the advantages of performing surgical operations in an atmosphere treated by bactericidal radiant energy:

1. Reduction in the number of post-operative wound infections of over 85 per cent.

2. Elimination of the occasional death from wound infection.

3. Reduction in the number of patients with a post-operative temperature above 38 C. (100.4 F.) as follows:

Thoracoplasties, from 68 per cent to 30 per cent.

Radical mastectomies from 46 per cent to 34 per cent.

Inguinal herniorrhaphies from 36 per cent to 22 per cent.

4. Reduction in the number of patients with a temperature elevation above 37.5 C. (99.5 F.) for more than 4 days after operation as follows:

Thoracoplasties from 78 per cent to 22 per cent.

Radical mastectomies from 54 per cent to 21 per cent.

Inguinal herniorrhaphies from 46 per cent to 14 per cent.

5. Improvement in wound healing.

6. Lessened systemic reaction.

7. Shortened convalescence.

With meticulous operating room asepsis, development of a delicate atraumatic technic, the use of the least irritating suture material, and the elimination of air-borne contamination of the operative wound and sterile supplies by the use of bactericidal radiant energy, wound infections in clean primary incisions may be almost eliminated. Bacteria from the hair follicles and glands in the skin, breaks in technic or blood-borne bacteria from a focus elsewhere in the body, are at present the only sources of infection of clean operative wounds.

Treatment of Pelvic Inflammation by the Iontophoresis of a Choline Compound. Adolph Jacoby.

Am. J. Obst. & Gynec. 37:272 (Feb.) 1939.

Jacoby reviews the treatment of fifty patients. This time his original technique has been changed so that 20 cc. of a 0.5 per cent solution of acetyl-beta-methylcholine-chloride is used instead of 1 per cent. The vaginal electrode is likewise modified and illustrated. The treatment consisted in fifteen milliamperes of current applied for twenty minutes. He concludes that whenever the pelvic pathology consists of an exudative process, a prompt recession and restoration to normal occurs following the treatment by iontophoresis of acetyl-beta-methylcholine-chloride. On the other hand, if the pathologic state includes organized inflammatory products or definite pathologic tissue alteration, such as cysts, or tumors, no change is produced.

It is therefore, concluded by Jacoby that in the method of treatment by iontophoresis of acetyl-

beta-methylcholine-chloride, we have a therapeutic means of differential diagnosis of pelvic exudative inflammation in any stage.

Infant Gymnastics in Treatment and Prevention of Spinal Deformity. H. Storck.

Med. Welt. 12:1809 (Dec. 17) 1938.

The occurrence of scoliosis is often first noticed when the child is examined by the school medical officer. Storck believes that it can be prevented in children if simple gymnastics are instituted in infancy. The muscles of the back in infants should be exercised by placing them in uncomfortable abdominal positions out of which they then try to twist themselves. Mothers can be taught to lay the infant prone on the forearm or to support it in the supine position and then teach it to raise itself up.

Tissue Injury by Radiant Energy and Liberation of Histamine. C. H. Keleaway; H. F. Holden, and E. R. Trethewie.

Australian J. Exper. Biol. & M. Sci. 16:331 (Dec.) 1938.

A large area of the perfused lung of a dog was exposed to radiant energy and there followed a small output of histamine, not only after irradiation with ultraviolet but also with visible and infra-red rays. The injurious effects are different from those due to snake venoms which are mediated by lysocithin.

An Evaluation of the Thin-Window Bactericidal Lamp. Abraham Fisher.

Pennsylvania M. J. 42:910 (May) 1939.

A thin-window bactericidal lamp emitting light rich in bactericidal wavelengths has been used in a series of pyodermias and fungous diseases. Practically no irritating symptoms were produced and little pigmentation.

The effect of the light on tinea capitis, paronychia, perlèche, and infected varicose ulcers, except in a few cases, was not encouraging.

The effect of the light on impetigo contagiosa, tinea corporis, and infected incisions was satisfactory.

The results observed in the treatment of ecthyma, papulovesicular pruriginous dermatophytosis of the feet, and inguinal-scrotal dermatophytosis were considered very good. If this light should prove efficient in the treatment of scrotal dermatophytosis, we shall have a very valuable therapeutic modality, as the results from the usual treatment of this condition are generally unsatisfactory.

Such a small series of cases, as here recorded, does not give a final and conclusive evaluation of the thin-window bactericidal lamp. However, the results obtained in certain dermatologic diseases were startling, and even if this modality of treatment be confined to these conditions alone, we have a valuable addition to our dermatologic armamentarium.